

5.4.5 EARTHQUAKE

This section provides a profile and vulnerability assessment for the earthquake hazard.

HAZARD PROFILE

This section provides profile information including description, extent, location, previous occurrences and losses and the probability of future occurrences.

Description

An earthquake is the sudden movement of the Earth's surface caused by the release of stress accumulated within or along the edge of the Earth's tectonic plates, a volcanic eruption, or by a manmade explosion (Federal Emergency Management Agency [FEMA], 2010; Shedlock and Pakiser, 1997). Most earthquakes occur at the boundaries where the Earth's tectonic plates meet (faults); however, less than 10 percent of earthquakes occur within plate interiors. New York State is in an area where plate interior-related earthquakes occur. As plates continue to move and plate boundaries change over geologic time, weakened boundary regions become part of the interiors of the plates. These zones of weakness within the continents can cause earthquakes in response to stresses that originate at the edges of the plate or in the deeper crust (Shedlock and Pakiser, 1997).

The location of an earthquake is commonly described by its focal depth and the geographic position of its epicenter. The focal depth of an earthquake is the depth from the Earth's surface to the region where an earthquake's energy originates (the focus or hypocenter). The epicenter of an earthquake is the point on the Earth's surface directly above the hypocenter (Shedlock and Pakiser, 1997). Earthquakes usually occur without warning and their effects can impact areas of great distance from the epicenter (FEMA, 2001).

According to the U.S. Geological Society (USGS) Earthquake Hazards Program, an earthquake hazard is anything associated with an earthquake that may affect resident's normal activities. This includes surface faulting, ground shaking, landslides, liquefaction, tectonic deformation, tsunamis, and seiches. A description of each of these is provided below.

- **Surface faulting:** Displacement that reaches the earth's surface during slip along a fault. Commonly occurs with shallow earthquakes, those with an epicenter less than 20 kilometers.
- **Ground motion (shaking):** The movement of the earth's surface from earthquakes or explosions. Ground motion or shaking is produced by waves that are generated by sudden slip on a fault or sudden pressure at the explosive source and travel through the earth and along its surface.
- **Landslide:** A movement of surface material down a slope.
- **Liquefaction:** A process by which water-saturated sediment temporarily loses strength and acts as a fluid, like when you wiggle your toes in the wet sand near the water at the beach. This effect can be caused by earthquake shaking.
- **Tectonic Deformation:** A change in the original shape of a material due to stress and strain.
- **Tsunami:** A sea wave of local or distant origin that results from large-scale seafloor displacements associated with large earthquakes, major submarine slides, or exploding volcanic islands.

- **Seiche:** The sloshing of a closed body of water from earthquake shaking (USGS, 2012).

Extent

Seismic waves are the vibrations from earthquakes that travel through the Earth and are recorded on instruments called seismographs. The magnitude or extent of an earthquake is a measured value of the earthquake size, or amplitude of the seismic waves, using a seismograph. The Richter magnitude scale (Richter Scale) was developed in 1932 as a mathematical device to compare the sizes of earthquakes (USGS, 1989). The Richter Scale is the most widely-known scale that measures the magnitude of earthquakes (Shedlock and Pakiser, 1997; USGS, 2004). It has no upper limit and is not used to express damage. An earthquake in a densely populated area, which results in many deaths and considerable damage, may have the same magnitude and shock in a remote area that did not cause any damage (USGS, 1989). Table 5.4.5-1 presents the Richter Scale magnitudes and corresponding earthquake effects.

Table 5.4.5-1. Richter Scale

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

Source: USGS, 2006

The intensity of an earthquake is based on the observed effects of ground shaking on people, buildings, and natural features, and varies with location. Intensity is expressed by the Modified Mercalli Scale; a subjective measure that describes how strong a shock was felt at a particular location (Shedlock and Pakiser, 1997; USGS, 2004). The Modified Mercalli Scale expresses the intensity of an earthquake's effects in a given locality in values ranging from I to XII. Table 5.4.5-2 summarizes earthquake intensity as expressed by the Modified Mercalli Scale. Table 5.4.5-3 displays the Modified Mercalli Scale and peak ground acceleration equivalent.

Table 5.4.5-2. Modified Mercalli Intensity Scale

Mercalli Intensity	Description
I	Felt by very few people; barely noticeable.
II	Felt by few people, especially on upper floors.
III	Noticeable indoors, especially on upper floors, but may not be recognized as an earthquake.
IV	Felt by many indoors, few outdoors. May feel like passing truck.
V	Felt by almost everyone, some people awakened. Small objects moves, trees and poles may shake.
VI	Felt by everyone; people have trouble standing. Heavy furniture can move, plaster can fall off walls. Chimneys may be slightly damaged.
VII	People have difficulty standing. Drivers feel their cars shaking. Some furniture breaks. Loose bricks fall from buildings. Damage is slight to moderate in well-built buildings; considerable in poorly built buildings.
VIII	Well-built buildings suffer slight damage. Poorly built structures suffer severe damage. Some walls collapse.

Mercalli Intensity	Description
IX	Considerable damage to specially built structures; buildings shift off their foundations. The ground cracks. Landslides may occur.
X	Most buildings and their foundations are destroyed. Some bridges are destroyed. Dams are seriously damaged. Large landslides occur. Water is thrown on the banks of canals, rivers, lakes. The ground cracks in large areas.
XI	Most buildings collapse. Some bridges are destroyed. Large cracks appear in the ground. Underground pipelines are destroyed.
XII	Almost everything is destroyed. Objects are thrown into the air. The ground moves in waves or ripples. Large amounts of rock may move.

Source(s): Michigan Tech University, 2007; Nevada Seismological Laboratory, 1996

Table 5.4.5-3. Modified Mercalli Intensity (MMI) and PGA Equivalents

MMI	Acceleration (%g) (PGA)	Perceived Shaking	Potential Damage
I	< .17	Not Felt	None
II	.17 – 1.4	Weak	None
III	.17 – 1.4	Weak	None
IV	1.4 – 3.9	Light	None
V	3.9 – 9.2	Moderate	Very Light
VI	9.2 – 18	Strong	Light
VII	18 – 34	Very Strong	Moderate
VIII	34 – 65	Severe	Moderate to Heavy

Source: Draft NYS HMP, 2011

Seismic hazards are often expressed in terms of Peak Ground Acceleration (PGA) and Spectral Acceleration (SA). USGS defines PGA and SA as the following: ‘PGA is what is experienced by a particle on the ground. Spectral Acceleration (SA) is approximately what is experienced by a building, as modeled by a particle mass on a massless vertical rod having the same natural period of vibration as the building’ (USGS, Date Unknown). Both PGA and SA can be measured in *g* (the acceleration due to gravity) or expressed as a percent acceleration force of gravity (%g). PGA and SA hazard maps provide insight into location specific vulnerabilities (Draft NYS HMP, 2011).

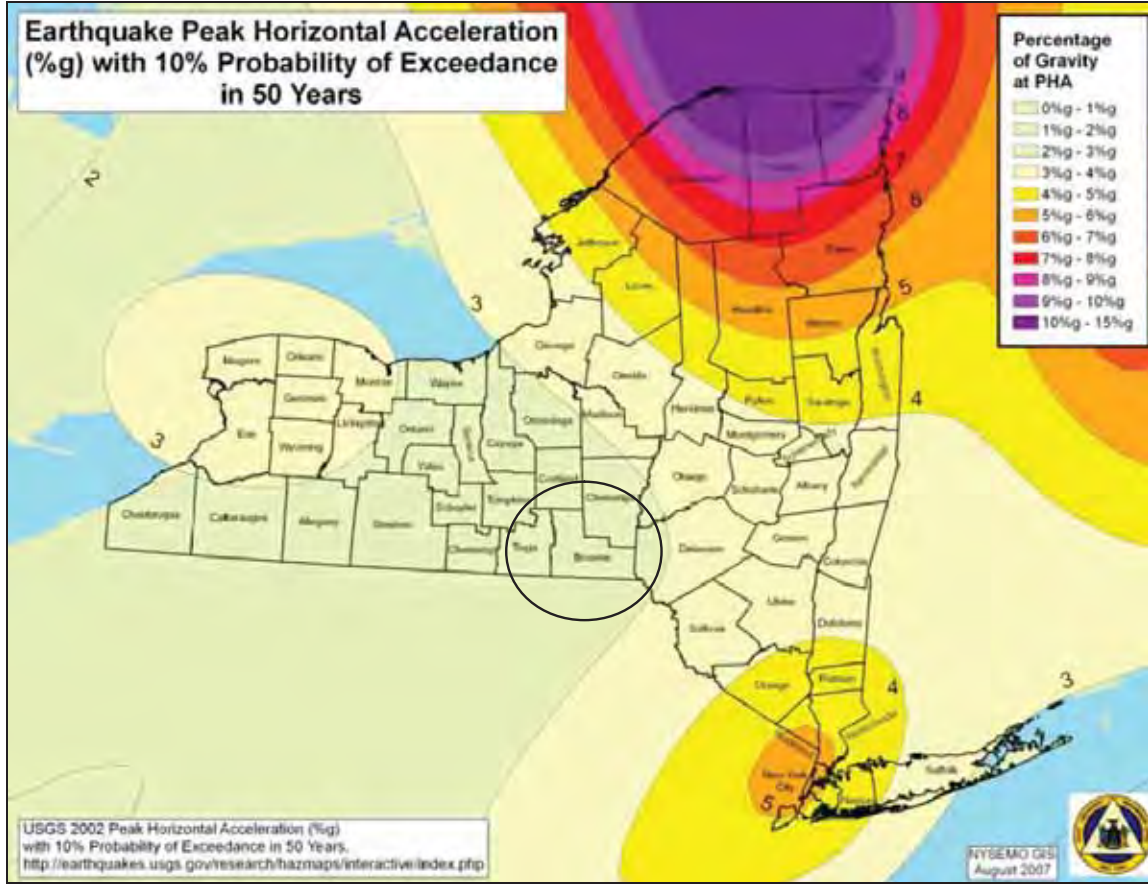
More specifically, PGA is a common earthquake measurement that shows three things: the geographic area affected, the probability of an earthquake of each given level of severity, and the strength of ground movement (severity) expressed in terms of percent of acceleration force of gravity (%g). In other words, PGA expresses the severity of an earthquake and is a measure of how hard the earth shakes (or accelerates) in a given geographic area (Draft NYS HMP, 2011).

National maps of earthquake shaking hazards have been produced since 1948. They provide information essential to creating and updating the seismic design requirements for building codes, insurance rate structures, earthquake loss studies, retrofit priorities and land use planning used in the U.S. Scientists frequently revise these maps to reflect new information and knowledge. Buildings, bridges, highways and utilities built to meet modern seismic design requirements are typically able to withstand earthquakes better, with less damages and disruption. After thorough review of the studies, professional organizations of engineers update the seismic-risk maps and seismic design requirements contained in building codes (Brown et al., 2001).

The USGS recently updated the National Seismic Hazard Maps in 2008 which superceded the 2002 maps. New seismic, geologic, and geodetic information on earthquake rates and associated ground shaking were

incorporated into these revised maps. The 2008 map represents the best available data as determined by the USGS (USGS, 2008).

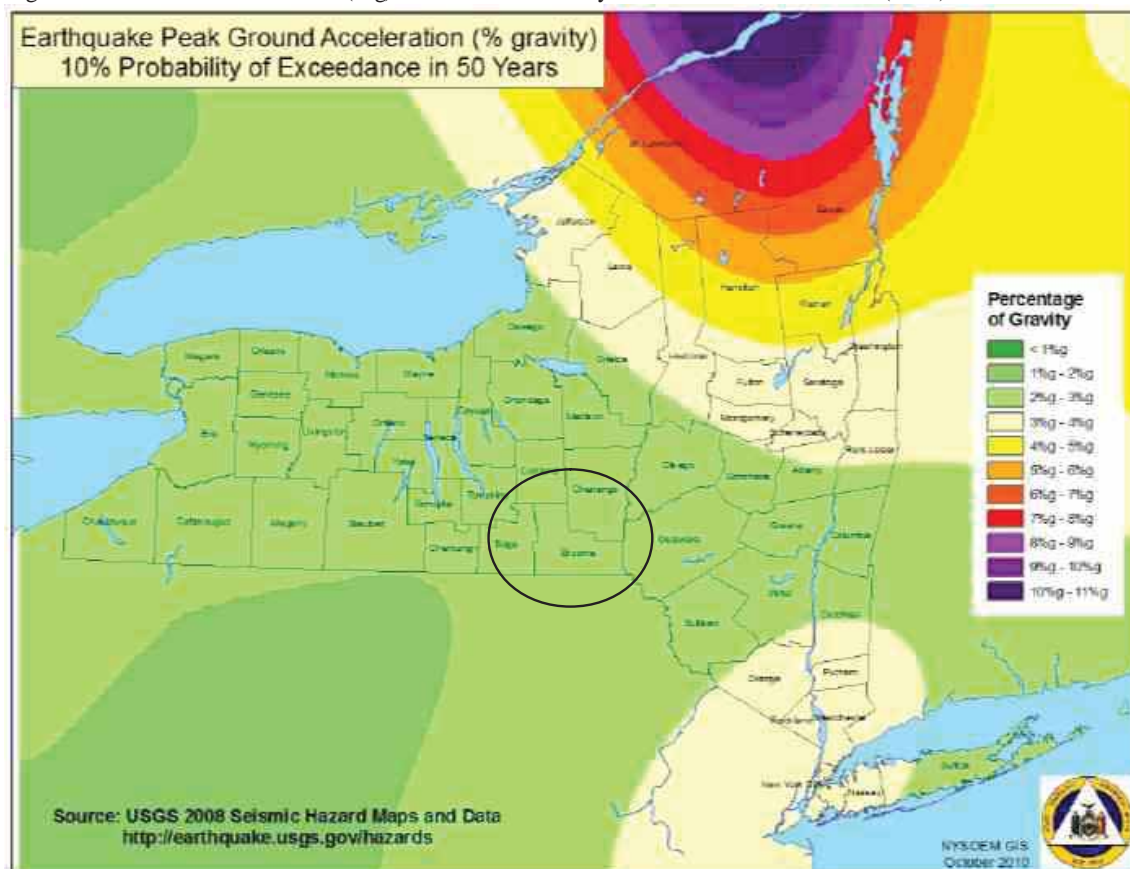
Figure 5.4.5-1. Peak Acceleration (%g) with 10% Probability of Exceedance in 50 Years (2002)



Source: Draft NYS HMP, 2011

Note: The black circle indicates the approximate location of Broome County.

Figure 5.4.5-2. Peak Acceleration (% g) with 10% Probability of Exceedance in 50 Years (2008)

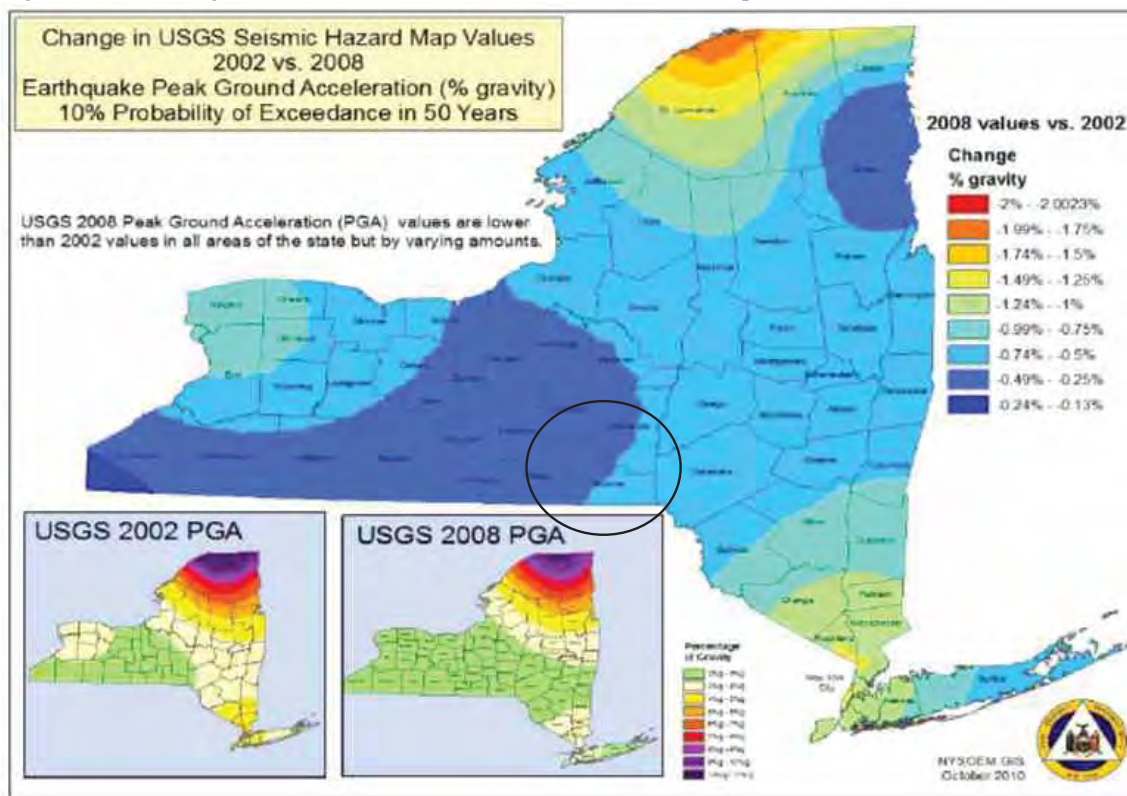


Source: Draft NYS HMP, 2011

Note: The black circle indicates the approximate location of Broome County.

The 2002 Seismic Hazard Map shows that Broome County has a PGA between 2 and 3% (Figure 5.4.5-3). The 2008 Seismic Hazard Map shows that Broome County has a PGA between 2 and 3% (Figure 5.4.5-2). These maps are based on peak ground acceleration (%g) with 10% probability of exceedance in 50 years.

Figure 5.4.5-3. Change Between USGS 2002 and 2008 Seismic Hazard Maps

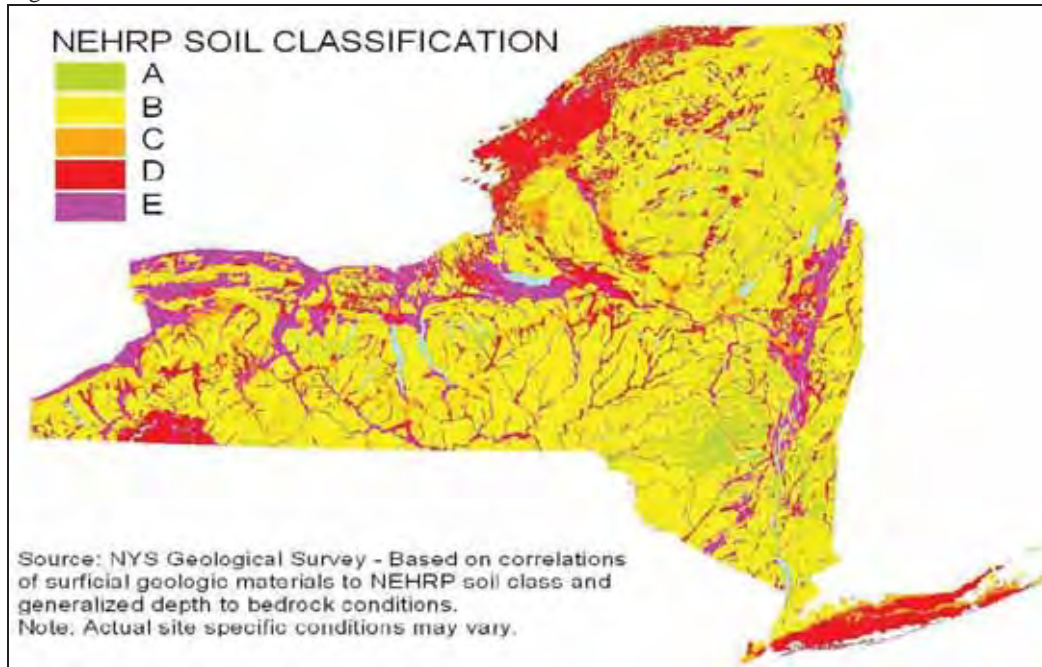


Source: Draft NYS HMP, 2011

Note: The black circle indicates the approximate location of Broome County.

The New York State Geological Survey conducted seismic shear-wave tests of the State's surficial geology (glacial deposits). Based on these test results, the surficial geologic materials of New York State were categorized according to the National Earthquake Hazard Reduction Program's (NEHRP) Soil Site Classifications (Figure 5.4.5-4). The NEHRP developed five soil classifications that impact the severity of an earthquake. The soil classification system ranges from A to E, where A represents hard rock that reduces ground motions from an earthquake and E represents soft soils that amplify and magnify ground shaking and increase building damage and losses. Figure 5.4.5-5 illustrates the NEHRP soil classifications in Broome County, as provided by NYSEMO (O'Brien, 2008). Table 5.4.5-4 summarizes the NEHRP soil classifications shown on Figure 5.4.5-5.

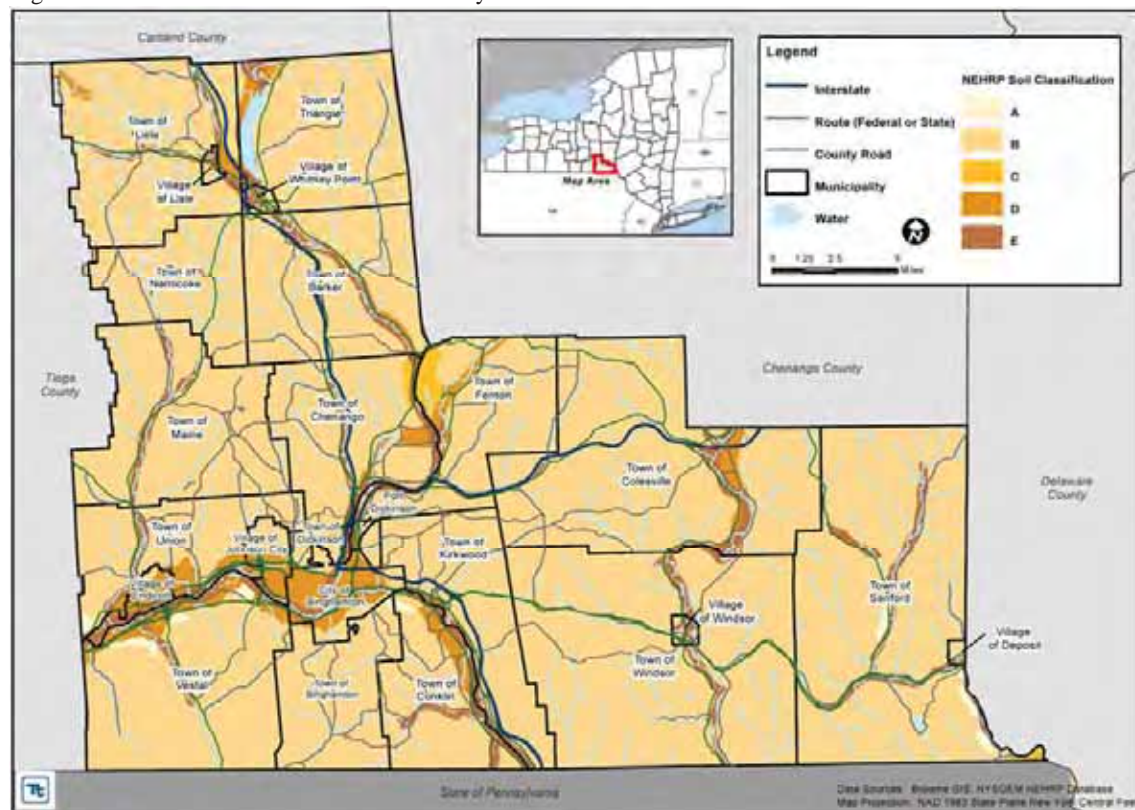
Figure 5.4.5-4. NEHRP Soils in New York



Source: Draft NYS HMP, 2011

As illustrated in Figure 5.4.5-5, Broome County is comprised of NEHRP soil classes A through E. The majority of the County is soil class B; however, classes C through E are located along riverine reaches.

Figure 5.4.5-5. NEHRP Soils in Broome County



Source: Broome GIS; O'Brien, 2008

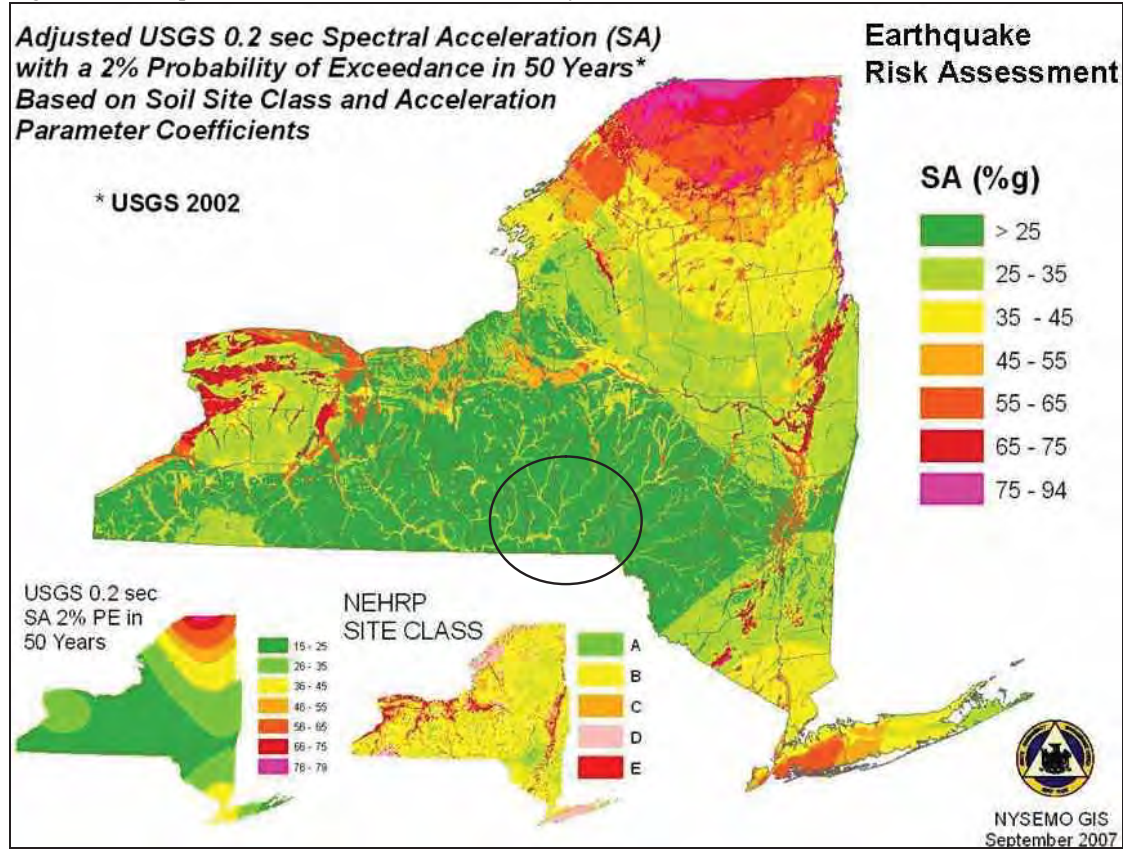
Table 5.4.5-4. NEHRP Soil Classifications

Soil Classification	Description
A	Very hard rock (e.g., granite, gneisses)
B	Sedimentary rock or firm ground
C	Stiff clay
D	Soft to medium clays or sands
E	Soft soil including fill, loose sand, waterfront, lake bed clays

Source: Draft NYS HMP, 2011

The NEHRP soil classification for the State has enabled the affect of soils to be factored with the 2002 USGS seismic hazard maps. Figure 5.4.5-6 and Figure 5.4.5-7 now illustrate the State and County’s earthquake SA hazard with local soil types factored in, respectively.

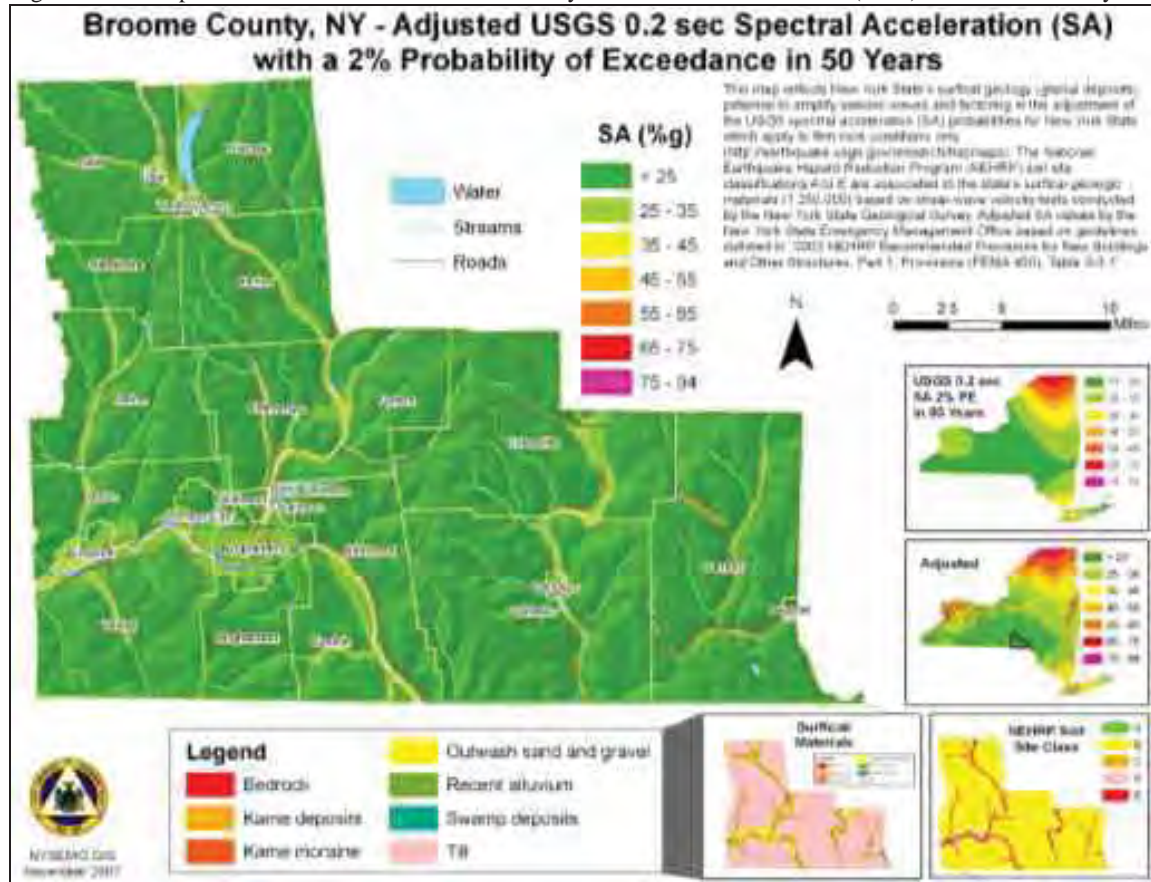
Figure 5.4.5-6. Spectral Acceleration with 2% Probability of Exceedance in 50 Years (2002) for New York State



Source: Draft NYS HMP, 2011

Note: The black circle indicates the approximate location of Broome County.

Figure 5.4.5-7. Spectral Acceleration with 2% Probability of Exceedance in 50 Years (2002) for Broome County

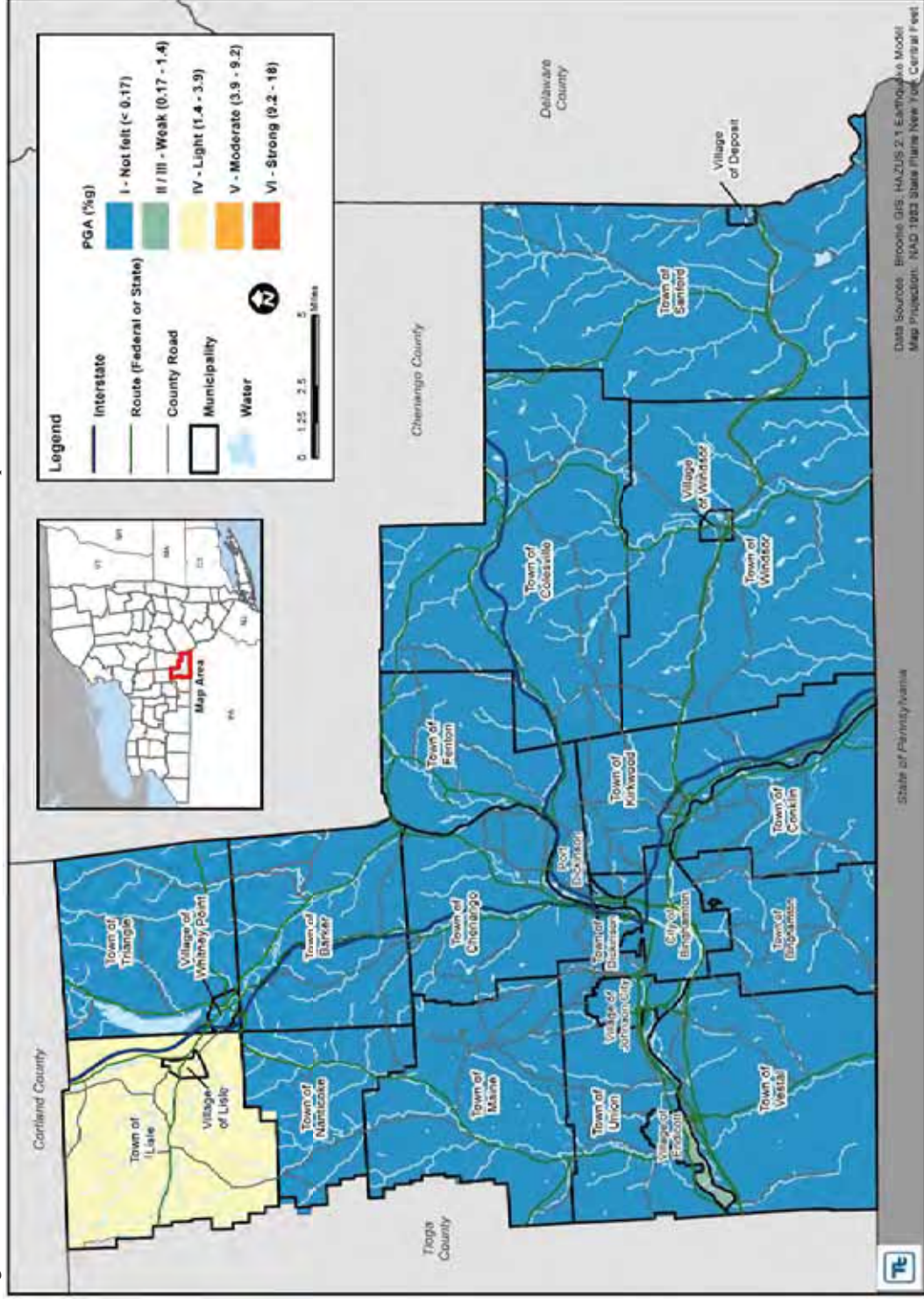


Source: Draft NYS HMP, 2011

A probabilistic assessment was conducted for the 100-, 500- and 2,500-year mean return periods (MRP) through a Level 2 analysis in HAZUS-MH 2.1 to analyze the earthquake hazard for Broome County. The HAZUS analysis evaluates the statistical likelihood that a specific event will occur and what consequences will occur. A 100-year MRP event is an earthquake with a 1% chance that the mapped ground motion levels (PGA) will be exceeded in any given year. For a 500-year MRP, there is a 0.2% chance the mapped PGA will be exceeded in any given year. For a 2,500-year MRP, there is a 0.04% chance the mapped PGA will be exceeded in any given year. Figure 5.4.5-8 through Figure 5.4.5-10 illustrates the geographic distribution of PGA (g) across Broome County or 100-, 500- and 2,500-year MRP events at the Census-Tract level.

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Figure 5.4.5-8. Peak Ground Acceleration Modified Mercalli Scale for a 100- Year MRP Earthquake Event



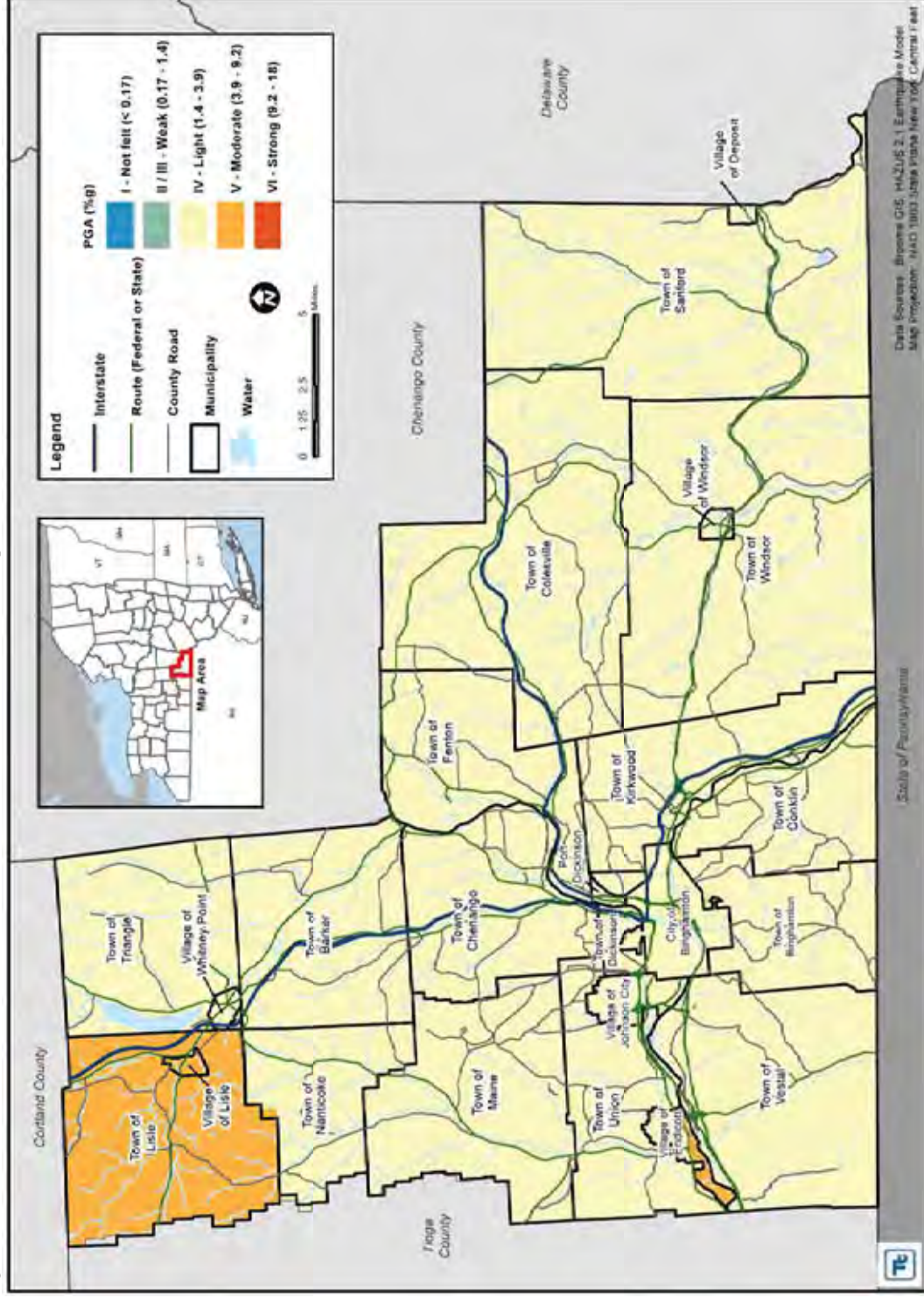
Source: HAZUS 2.1;

Note: The peak ground acceleration for the 100-year MRP is 0.64 to 2 %g.



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Figure 5.4.5-9. Peak Ground Acceleration Modified Mercalli Scale for a 500-Year MRP Earthquake Event

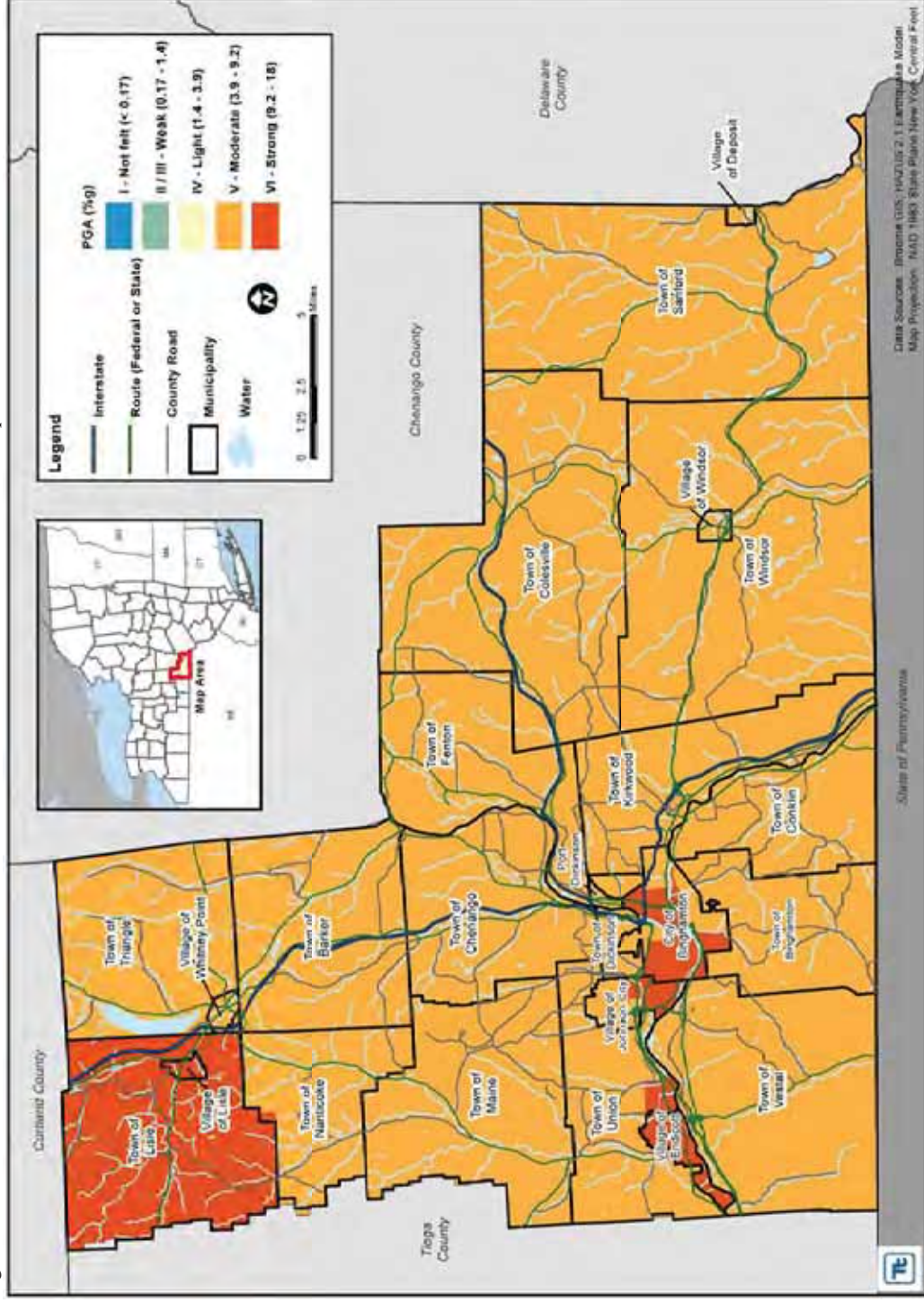


Source: HAZUS 2.1;

Note: The peak ground acceleration for the 500-year MRP is 2 to 6 %g



Figure 5.4.5-10. Peak Ground Acceleration Modified Mercalli Scale for a 2,500-Year MRP Earthquake Event



Source: HAZUS 2.1;

Note: The peak ground acceleration for the 2,500-year MRP is 5.2 to 15 %g.



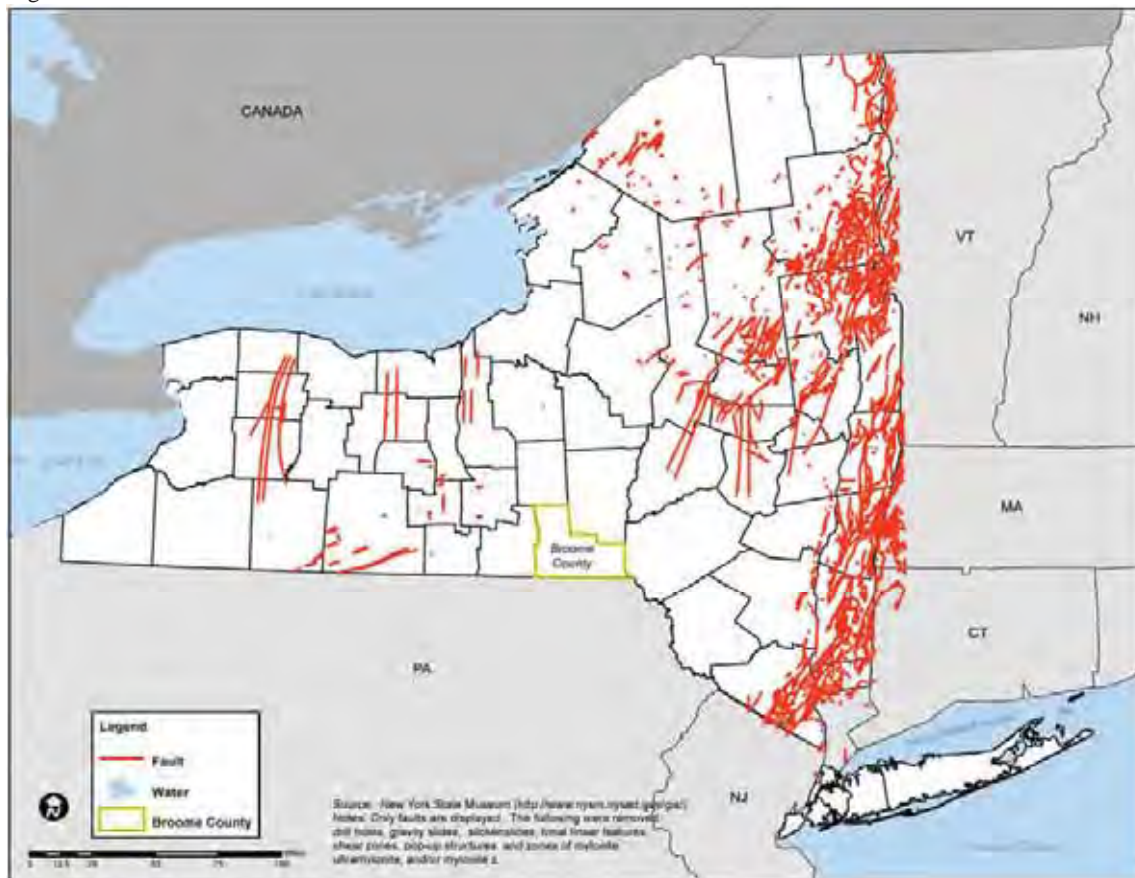
Location

As noted in the NYS HMP, the importance of the earthquake hazard in New York State is often underestimated because other natural hazards (for example, hurricanes and floods) occur more frequently and because major floods and hurricanes have occurred more recently than a major earthquake event (Draft NYS HMP, 2011). Typically areas east of the Rocky Mountains experience fewer and generally smaller earthquakes than the western U.S. However, the potential for earthquakes exists across all of New York State and the entire northeastern U.S. The New York City Area Consortium for Earthquake Loss Mitigation (NYCEM) ranks New York State as having the third highest earthquake activity level east of the Mississippi River (Tantala et al., 2003).

The closest plate boundary to the East Coast is the Mid-Atlantic Ridge, which is approximately 2,000 miles east of Pennsylvania. Over 200 million years ago, when the continent Pangaea rifted apart forming the Atlantic Ocean, the Northeast coast of America was a plate boundary. Being at the plate boundary, many faults were formed in the region. Although these faults are geologically old and are contained in a passive margin, they act as pre-existing planes of weakness and concentrated strain. When a strain exceeds the strength of the ancient fault, it ruptures causing an earthquake (Lehigh Earth Observatory, 2006).

There are numerous faults throughout New York State. Figure 5.4.5-11 illustrates the faults relative to Broome County (New York State Museum, 2012).

Figure 5.4.5-11. Faults in New York State

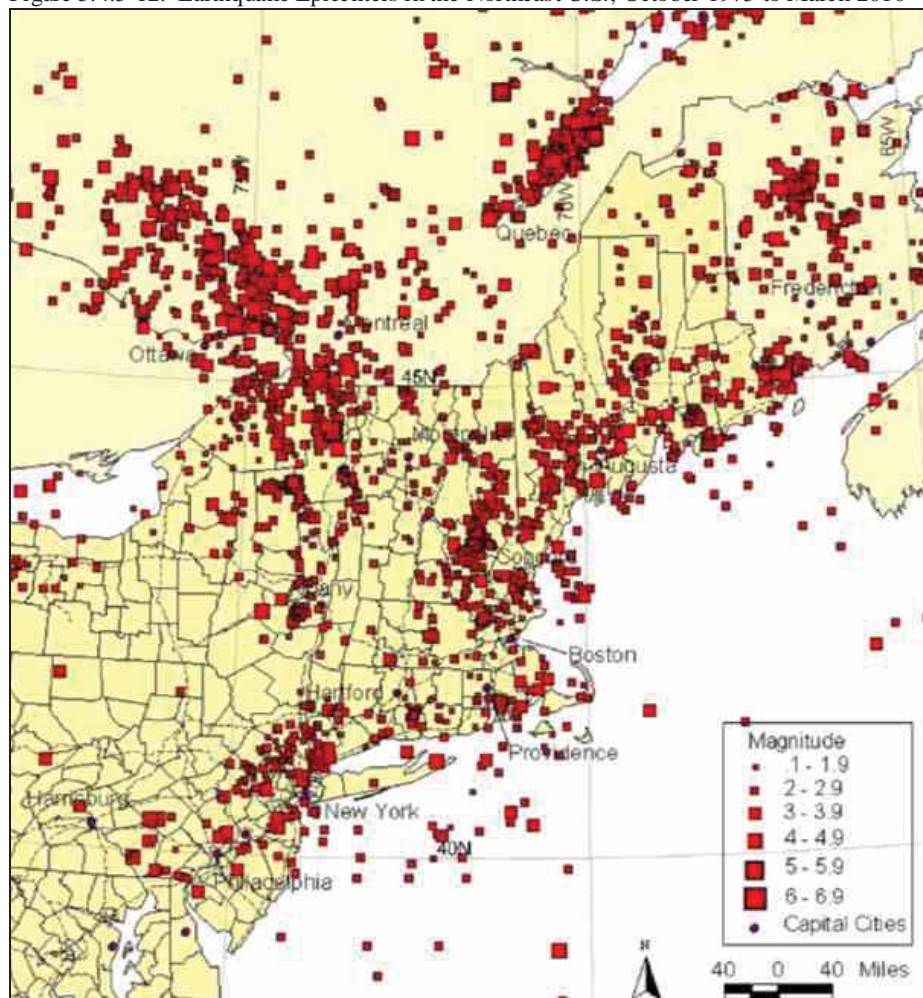


Source: New York State Museum, 2012

There are three general regions in New York State that have a higher seismic risk compared to other parts of the State. These regions are: 1) the north and northeast third of the State, which includes the North Country/Adirondack region and a portion of the greater Albany-Saratoga region; 2) the southeast corner, which includes the greater New York City area and western Long Island; and 3) the northwest corner, which includes Buffalo and its surrounding area. Overall, these three regions are the most seismically active areas of the State, with the north-northeast portion having the higher seismic risk and the northwest corner of the State has the lower seismic risk (DRAFT NYS HMP, 2011).

Figure 5.4.5-12 illustrates historic earthquake epicenters across the northeast U.S. and New York State between October 1975 and March 2010. There have been multiple earthquakes originating outside New York's borders that have been felt within the State. These quakes have come from Quebec, Canada and Massachusetts. According to the NYS HMP, such events are considered significant for hazard mitigation planning because they could produce damage within the State in certain situations.

Figure 5.4.5-12. Earthquake Epicenters in the Northeast U.S., October 1975 to March 2010



Source: DRAFT NYS HMP, 2011

Previous Occurrences and Losses

Many sources provided historical information regarding previous occurrences and losses associated with earthquakes throughout New York State. Therefore, with so many sources reviewed for the purpose of this HMP, loss and impact information for many events could vary depending on the sources.

According to the NYSDPC, USGS, NEIC and Lamont-Doherty, approximately 35 earthquake events have affected New York State between 1971 and 2011. Additional sources have noted other earthquake events within New York State as well. Table 5.4.5-5 depicts these earthquake events. Several of these events were located within the vicinity of Broome County.

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Table 5.4.5-5. Earthquake History in New York State, 1971-2012

Dates of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
May 23, 1971	Earthquake 3.5 – 4.1	Blue Mountain Lake, NY	N/A	N/A	No reference and/or no damage reported.	NYSDPC
June 7, 1974	Earthquake 3.0	Wappinger Falls, NY	N/A	N/A	Earthquake caused windows to break and a bookcase to topple. More than 100 aftershocks were reported through June 13 th .	NYSDPC, Stover and Coffman
June 9, 1975	Earthquake 3.5	Plattsburgh (Altona), NY	N/A	N/A	In Beekmantown on Lake Champlain, a chimney and fireplace were cracked. East of Beekmantown, in Fairfax, Vermont, slight damage was reported.	NYSDPC, Stover and Coffman
November 3, 1975	Earthquake 4.0	Raquette Lake, NY	N/A	N/A	No reference and/or no damage reported.	NYSDPC
March 10, 1979	Earthquake 3.2		N/A	N/A	Felt by some in Manhattan	Kim
February 2, 1983	Earthquake 3.0	Scarsdale-Lagrangeville, NY	N/A	N/A	Chimneys cracked	NYSDPC
October 7, 1983	Earthquake 5.1	Goodnow, Adirondack Mountains	N/A	N/A	An old chimney collapsed, about 20 tombstones slid or rotated, and some minor cracks formed in plaster walls in Blue Mountain Lake. Several landslides were reported. Light damage was reported in surrounding towns. It was felt over a wide range, including two provinces in Canada and 12 states.	NYSDPC, Stover and Coffman
October 19, 1985	Earthquake 4.0	Ardsey, NY	N/A	N/A	Windows broken in Newburgh, New York and Glenville, Connecticut. Plaster and drywall were cracked and glassware broke in Newburgh. Light damage was sustained in some towns in Connecticut, New Jersey and New York. It was felt over a large area of Connecticut, Massachusetts, New Jersey, New York and Pennsylvania. A moderate aftershock was felt on October 21 st in Connecticut, New York and New Jersey.	NYSDPC, Stover and Coffman, Kim
June 17, 1991	Earthquake 4.1	Richmondville, NY	N/A	N/A	No reference and/or no damage reported.	NYSDPC



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Dates of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
March 10, 1992	Earthquake 2.8	East Hampton, NY	N/A	N/A	Very minor damage to the area. The earthquake was centered in the Atlantic Ocean, about 15 miles south of Montauk. It was felt from the tip of eastern Long Island to New London, Connecticut.	NYSDPC, New York Times, Albany Times Union
March 22, 1994	Earthquake 3.6		N/A	N/A	No reference and/or no damage reported	NYSDPC
Earthquake April 20, 2000	Earthquake 3.8	Newcomb, NY	N/A	N/A	No reference and/or no damage reported	NYSDPC
November 6, 2000	Earthquake 2.4	Duanesburg, NY	N/A	N/A	No reference and/or no damage reported	NEIC
January 17, 2001	Earthquake 2.4		N/A	N/A	Felt in Upper East Side of Manhattan, Long Island city and Queens.	Kim
October 17, 2001	Earthquake 2.6		N/A	N/A	Felt in Upper West Side of Manhattan, Astoria and Queens	Kim
April 20, 2002	Earthquake 5.1	Au Sable Forks, NY	DR-1415	No	Largest earthquake to hit New York State in 20 years. People felt the earthquake from Washington, D.C. to Bangor, Maine. A state of emergency was declared in Essex and Clinton Counties. In Delaware County, the Towns of Delhi, Deposit, Hamden, Middletown, and Walton and the Village of Fleischmanns, all reported having felt the earthquake.	NYSDPC, USGS
May 24, 2002	Earthquake 3.1	Au Sable Forks, NY	N/A	N/A	Aftershock of the April 20 th event; no damage reported.	NYSDPC, USGS
March 26, 2007	Earthquake 1.8	Feura Bush, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
April 11, 2007	Earthquake 2.6	Wolcott, NY	N/A	N/A	No reference and/or no damage reported.	USGS
July 19, 2007	Earthquake 3.0	Lake Ontario, NY	N/A	N/A	No reference and/or no damage reported.	USGS



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Dates of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
July 24, 2007	Earthquake 2.6 – 3.1	Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
February 27, 2008	Earthquake 2.7	Howes Cave, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
May 28, 2008	Earthquake 1.8	Saratoga Springs, NY	N/A	N/A	No reference and/or no damage reported.	USGS
February 18, 2009	Earthquake 2.3 – 2.7	East Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
February 20, 2009	Earthquake 2.7	East Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
February 23, 2009	Earthquake 2.1	East Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
March 22, 2009	Earthquake 2.1 - 2.8	Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
May 18, 2009	Earthquake 2.1 - 3.0	Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
October 21, 2009	Earthquake 2.9	East Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
December 13, 2009	Earthquake 2.6 – 3.1	Berne, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
February 15, 2010	Earthquake 2.2	Berne, NY	N/A	N/A	No reference and/or no damage reported.	NEIC
February 18, 2010	Earthquake 2.7	Berne, NY	N/A	N/A	No reference and/or no damage reported.	NEIC



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Dates of Event	Event Type	Location	FEMA Declaration Number	County Designated?	Losses / Impacts	Source(s)
March 24, 2010	Earthquake 2.7	Berne, NY	N/A	N/A	No reference and/or no damage reported.	NEIC
June 23, 2010	Earthquake 5.5	Ontario and Quebec, Canada border	N/A	N/A	A minor earthquake in Canada was felt throughout the New York City and upstate New York area. The earthquake lasted about 30 seconds. Tremors were felt in the City of Binghamton.	NY1 News
August 23, 2011	Earthquake 5.9	Virginia	N/A	N/A	An earthquake centered in Virginia was felt up and down the east coast. In Broome County, many residents said they felt the earthquake.	Markham
August 25, 2011	Earthquake 2.0 – 2.8	Altamont, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
August 26, 2011	Earthquake 2.2	Altamont, NY	N/A	N/A	No reference and/or no damage reported.	NEIC
August 27, 2011	Earthquake 2.9	Altamont, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
November 21, 2011	Earthquake 2.4	Moirra, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
January 7, 2012	Earthquake 2.1	Bombay, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
January 23, 2012	Earthquake 2.3	Johnsburg, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
March 23, 2012	Earthquake 2.5	Mt. Morris, NY	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC
September 8, 2012	Earthquake 2.1	Greenwich, CT	N/A	N/A	No reference and/or no damage reported.	USGS, NEIC

Source(s): NYSDPC, 2008; Draft NYS HMP, 2011; NEIC, 2011; USGS, 2011; Kim, 1999; Stover and Coffman, 1989
 DR Disaster Declaration
 FEMA Federal Emergency Management Agency
 N/A Not Applicable
 NEIC National Earthquake Information Center
 NYSDPC New York State Disaster Preparedness Commission
 USGS U.S. Geological Survey



Earthquakes in Broome County are not common, with documented information on earthquake events and their location is being relatively scarce. According to Planning Area officials, there is no record of earthquake occurrences within the Planning Area. However, depending on the magnitude, the impacts of earthquake events can be far-reaching; therefore, reported incidences within the surrounding counties or states could have created indirect impacts upon the Planning Area.

Probability of Future Events

Earthquake hazard maps illustrate the distribution of earthquake shaking levels that have a certain probability of occurring over a given time period. According to the USGS, in 2008, Broome County had a PGA of 2-3%g for earthquakes with a 10-percent probability of occurring within 50 years.

The NYSDPC indicates that the earthquake hazard in New York State is often understated because other natural hazards occur more frequently (for example: hurricanes, tornadoes and flooding) and are much more visible. However, the potential for earthquakes does exist across the entire northeastern U.S., and New York State is no exception (DRAFT NYS HMP, 2011).

Earlier in this section, the identified hazards of concern for Broome County were ranked. NYSOEM conducts a similar ranking process for hazards that affect the State. The probability of occurrence, or likelihood of the event, is one parameter used for ranking hazards. Based on historical records and input from the Planning Committee, the probability of occurrence for earthquakes in the County is considered “occasional” (is likely to occur within 100 years as presented in Table 5.3-3). Although no reported incidences have occurred within Broome County, it is anticipated that the County will experience indirect impacts from earthquakes that may affect the general building stock, local economy and may induce secondary hazards such as ignite fires and cause utility failure.

Climate Change

The impacts of global climate change on earthquake probability are unknown. Some scientists say that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the earth’s crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. NASA and USGS scientists found that retreating glaciers in southern Alaska may be opening the way for future earthquakes (NASA, 2004).

Secondary impacts of earthquakes could be magnified by climate change. Soils saturated by repetitive storms could experience liquefaction during seismic activity due to the increased saturation. Dams storing increased volumes of water due to changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts.

VULNERABILITY ASSESSMENT

To understand risk, a community must evaluate what assets are exposed or vulnerable in the identified hazard area. For the earthquake hazard, the entire County has been identified as the exposed hazard area. Therefore, all assets in Broome County (population, structures, critical facilities and lifelines), as described in the County Profile (Section 4), are vulnerable. The following section includes an evaluation and estimation of the potential impact of the earthquake hazard on Broome County including the following:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impact on: (1) life, safety and health of residents, (2) general building stock, (3) critical facilities, (4) economy and (5) future growth and development
- Effect of climate change on vulnerability
- Change of vulnerability as compared to that presented in the 2007 Broome County Hazard Mitigation Plan
- Further data collections that will assist understanding of this hazard over time

Overview of Vulnerability

Earthquakes usually occur without warning and can impact areas a great distance from their point of origin. The extent of damage depends on the density of population and building and infrastructure construction in the area shaken by the quake. Some areas may be more vulnerable than others based on soil type, the age of the buildings and building codes in place. Compounding the potential for damage – historically, Building Officials Code Administration (BOCA) used in the Northeast were developed to address local concerns including heavy snow loads and wind; seismic requirements for design criteria are not as stringent compared to the west coast’s reliance on the more seismically-focused Uniform Building Code). As such, a smaller earthquake in the Northeast can cause more structural damage than if it occurred out west.

The entire population and general building stock inventory of the County is at risk of being damaged or experiencing losses due to impacts of an earthquake. Potential losses associated with the earth shaking were calculated for Broome County for three probabilistic earthquake events, the 100-year, 500- and 2,500-year mean return periods (MRP). The impacts on population, existing structures, critical facilities and the economy within Broome County are presented below, following a summary of the data and methodology used.

Data and Methodology

A probabilistic assessment was conducted for Broome County for the 100-, 500- and 2,500-year MRPs through a Level 2 analysis in HAZUS-MH 2.1 to analyze the earthquake hazard and provide a range of loss estimates for Broome County. The probabilistic method uses information from historic earthquakes and inferred faults, locations and magnitudes, and computes the probable ground shaking levels that may be experienced during a recurrence period by Census tract. According to the New York City Area Consortium for Earthquake Loss Mitigation (NYCEM), probabilistic estimates are best for urban planning, land use, zoning and seismic building code regulations (NYCEM, 2003). The default assumption is a magnitude 7 earthquake for all return periods. In addition, an annualized loss run was also conducted in HAZUS-MH 2.1 to estimate the annualized general building stock dollar losses for Broome County.

As discussed in Section 5.2, a Level 1 analysis is a basic estimate of earthquake losses based on national databases and using the default data in the model. Default demographic data (U.S. Census 2000) in HAZUS-MH 2.1 and updated general building stock data based on the County's assessor data were used for the earthquake analysis. Critical facilities (essential facilities, transportation features, utilities and user-defined facilities) were also updated and used in place of the HAZUS-MH 2.1 defaults.

Ground shaking is the primary cause of earthquake damage to man-made structures and soft soils amplify ground shaking. One contributor to the site amplification is the velocity at which the rock or soil transmits shear waves (S-waves). The NEHRP developed five soil classifications defined by their shear-wave velocity that impact the severity of an earthquake. The soil classification system ranges from A to E, where A represents hard rock that reduces ground motions from an earthquake and E represents soft soils that amplify and magnify ground shaking and increase building damage and losses. Broome County is comprised of NEHRP soil classes A through E, or very hard rock to soft soils. Figure 5.4.5-5 in this profile illustrates the NEHRP soil classifications in Broome County. According to NYCEM, soft soils (NEHRP soil classed D and E) can amplify ground shaking to damaging levels even in a moderate earthquake (NYCEM, 2003).

The local soil map provided by NYSOEM with Broome County's NEHRP soil classes was entered into HAZUS-MH 2.1 to replace default soil conditions (Figure 5.4.5-5). These data updates allowed for a Level 2 earthquake analysis. Groundwater was set at a depth of five-feet (default setting). Damages and loss due to liquefaction, landslide or surface fault rupture were not included in this analysis.

In addition to the probabilistic scenarios mentioned, an annualized loss run was conducted in HAZUS 2.1 to estimate the annualized general building stock dollar losses for the County. The annualized loss methodology combines the estimated losses associated with ground shaking for eight return periods: 100, 250, 500, 750, 1000, 1500, 2000, 2500-year, which are based on values from the USGS seismic probabilistic curves. Annualized losses are useful for mitigation planning because they provide a baseline upon which to 1) compare the risk of one hazard across multiple jurisdictions and 2) compare the degree of risk of all hazards for each participating jurisdiction.

As noted in the HAZUS-MH Earthquake User Manual '*Uncertainties are inherent in any loss estimation methodology. They arise in part from incomplete scientific knowledge concerning earthquakes and their effects upon buildings and facilities. They also result from the approximations and simplifications that are necessary for comprehensive analyses. Incomplete or inaccurate inventories of the built environment, demographics and economic parameters add to the uncertainty. These factors can result in a range of uncertainty in loss estimates produced by the HAZUS Earthquake Model, possibly at best a factor of two or more.*' However, HAZUS' potential loss estimates are acceptable for the purposes of this HMP.

The occupancy classes available in HAZUS-MH 2.1 were condensed into the following categories (residential, commercial, industrial, agricultural, religious, government, and educational) to facilitate the analysis and the presentation of results. Residential loss estimates address both multi-family and single family dwellings. Impacts to critical facilities and utilities were also evaluated.

Data used to assess this hazard include data available in the HAZUS-MH 2.1 earthquake model, USGS data, data provided by NYSOEM, professional knowledge, and information provided by the County's Planning Committee. All exposure and loss estimates discussed in the assessment below are for Broome County.

Impact on Life, Health and Safety

Overall, the entire population of Broome County is exposed to the earthquake hazard event. According to the 2010 U.S. Census, Broome County had a population of 200,600 people. The impact of earthquakes on life, health and safety is dependent upon the severity of the event. Risk to public safety and loss of life from an earthquake in Broome County is minimal with higher risk occurring in buildings as a result of damage to the structure, or people walking below building ornamentation and chimneys that may be shaken loose and fall as a result of the quake.

Populations considered most vulnerable are located in the built environment, particularly near unreinforced masonry construction. In addition, the vulnerable population includes the elderly (persons over the age of 65) and individuals living below the Census poverty threshold. These socially vulnerable populations are most susceptible, based on a number of factors including their physical and financial ability to react or respond during a hazard and the location and construction quality of their housing. Table 5.4.5-6 summarizes the County population over the age of 65 and individuals living below the Census poverty threshold.

Table 5.4.5-6. Broome County Population Statistics (2010 U.S. Census)

U.S. Census 2010 Population	U.S. Census 2010 Population Over 65	U.S. Census 2010 Population Under 5	Census Low-Income Households *
200,600	32,844	10,480	22,860

Source: U.S. Census, 2010 <http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

Note: *2008-2010 American Community Survey (3-Year Estimates) - Households with an income of less than \$24,999
<http://factfinder2.census.gov/faces/tableservices/jsf/pages/productview.xhtml?src=bkmk>

Residents may be displaced or require temporary to long-term sheltering due to the event. The number of people requiring shelter is generally less than the number displaced as some displaced persons use hotels or stay with family or friends following a disaster event. Table 5.4.5-7 summarizes the population HAZUS-MH 2.1 estimates will be displaced or will require short-term sheltering as a result of the 100-, 500- and 2,500-year MRP earthquake events.

Table 5.4.5-7. Summary of Estimated Sheltering Needs for Broome County

Scenario	Displaced Households	People Requiring Short-Term Shelter
100-Year Earthquake	0	0
500-Year Earthquake	15	10
2,500-Year Earthquake	151	102

Source: HAZUS-MH 2.1

Table 5.4.5-8. Estimated Population Displaced or Seeking Short-Term Shelter from the 500- and 2,500-year MRP Events per Municipality

Municipality	500-Year MRP Event		2,500-Year MRP Event	
	Displaced Persons	Persons Seeking Short-Term Sheltering	Displaced Persons	Persons Seeking Short-Term Sheltering
Barker (T)	0	0	0	0
Binghamton (C)	8	6	76	54
Binghamton (T)	0	0	0	0
Chenango (T)	0	0	1	1
Colesville (T)	0	0	0	0
Conklin (T)	0	0	1	0
Dickinson (T) and Port Dickinson (V)	0	0	1	1
Endicott (V)	2	1	16	10
Fenton (T)	0	0	1	0
Johnson City (V)	2	1	18	12
Kirkwood (T)	0	0	1	1
Lisle (T) and (V)	0	0	2	2
Maine (T)	0	0	0	0
Nanticoke (T)	0	0	0	0
Sanford (T) and Deposit (V)	0	0	0	0
Triangle (T) and Whitney Point (V)	0	0	0	0
Union (T)	3	2	28	17
Vestal (T)	0	0	3	3
Windsor (T) and (V)	0	0	1	0
Broome County	15	10	151	102

Source: HAZUS-MH 2.1

Note: The population displaced and seeking shelter was calculated using the 2000 U.S. Census data (HAZUS-MH 2.1 default demographic data). This data is considered appropriate given only the slight increase in population between 2000 and 2010 (less than one-percent increase).

According to the 1999-2003 NYCEM Summary Report (*Earthquake Risks and Mitigation in the New York / New Jersey / Connecticut Region*), there is a strong correlation between structural building damage and the number of injuries and casualties from an earthquake event. HAZUS-MH 2.1 estimates the number of people that may potentially be injured and/or killed by an earthquake depending upon the time of day the event occurs. These estimates are provided for three times of day (2:00am, 2:00pm and 5:00pm), representing the periods of the day that different sectors of the community are at their peak. The 2:00am estimate considers the residential occupancy at its maximum, the 2:00pm estimate considers the educational, commercial and industrial sector at their maximum and the 5:00pm estimate represents peak commuter time.

There are no injuries or casualties estimated for the 100-year event. For the 500-year event, a total of 10 injuries (medical attention, no hospitalization) are estimated if the event occurs at 2:00am, 2:00pm or 5:00pm. There are zero injuries that will require hospitalization and no casualties estimated at any time.

Table 5.4.5-9 summarizes the injuries and casualties estimated for the 2,500-year MRP earthquake event.

Table 5.4.5-9. Estimated Number of Injuries and Casualties from the 2,500-Year MRP Earthquake Event

Level of Severity	Time of Day		
	2:00 AM	2:00 PM	5:00 PM
Injuries	34	30	28
Hospitalization	5	4	8
Casualties	1	1	1

Source: HAZUS-MH 2.1

Impact on General Building Stock

After considering the population exposed to the earthquake hazard, the value of general building stock exposed to and damaged by 100-, 500- and 2,500-year MRP earthquake events was evaluated. In addition, annualized losses were calculated using HAZUS-MH 2.1. The entire study area's general building stock is considered at risk and exposed to this hazard.

As stated earlier, soft soils (NEHRP soil classed D and E) can amplify ground shaking to damaging levels even in a moderate earthquake (NYCEM, 2003). Therefore, buildings located on NEHRP soil classes D and E have an increased risk of damages from an earthquake. Table 5.4.5-10 summarizes the number of buildings in Broome County on NEHRP soils classed D and E.

Table 5.4.5-10. Buildings Located on NEHRP Soils Classed D and E in Broome County

Municipality	Total Building Count	Number of Buildings on NEHRP Soils D & E	
		Number of Buildings on NEHRP Soils D & E	Percent Buildings on NEHRP Soils D & E
Barker, Town of	1,196	184	15
Binghamton, City of	14,834	13,268	89
Binghamton, Town of	2,079	70	3
Chenango, Town of	4,673	1,587	34
Colesville, Town of	2,246	404	18
Conklin, Town of	2,359	1,365	58
Deposit, Village of	386	96	25
Dickinson, Town of	1,229	245	20
Endicott, Village of	4,381	3,719	85
Fenton, Town of	2,662	437	16
Johnson City, Village of	5,297	3,995	75
Kirkwood, Town of	2,285	133	6
Lisle, Town of	1,000	361	36
Lisle, Village of	135	111	82
Maine, Town of	2,100	316	15
Nanticoke, Town of	627	2	0
Port Dickinson, Village of	610	403	66
Sanford, Town of	1,428	191	13
Triangle, Town of	880	58	7
Union, Town of	11,239	4,627	41
Vestal, Town of	8,617	3,567	41
Whitney Point, Village of	411	360	88

Municipality	Total Building Count	Number of Buildings on NEHRP Soils D & E	Percent Buildings on NEHRP Soils D & E
Windsor, Town of	2,615	225	9
Windsor, Village of	345	176	51
Broome County	73,634	35,900	49

Source: NYSOEM; Broome GIS

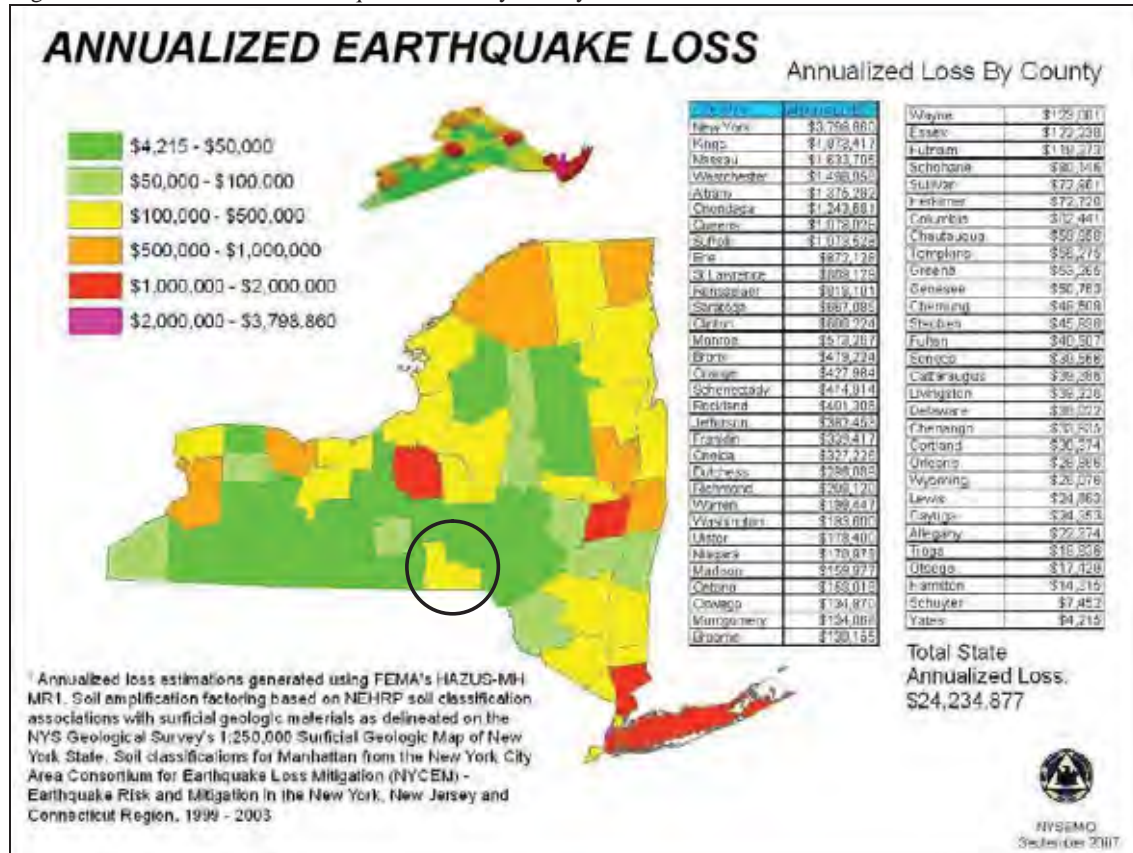
Note: The building inventory for the Village of Deposit only reflects with portion of the Village within Broome County's boundary.

The HAZUS-MH 2.1 model estimates the value of the exposed building stock and the loss (in terms of damage to the exposed stock). Refer to Table 4-3 in the County Profile (Section 4) for general building stock data replacement value statistics (structure and contents).

The NYS HMP conducted a HAZUS vulnerability assessment and reports estimates of earthquake losses factoring in NEHRP soil classes. The annualized losses are reported at the County level. For Broome County, the estimated annualized earthquake loss is \$130,155.

For this plan update and using HAZUS-MH 2.1, a probabilistic model was run for the purposes of this Plan to estimate annualized dollar losses for Broome County, also factoring in NEHRP soil classes. Annualized losses are useful for mitigation planning because they provide a baseline upon which to 1) compare the risk of one hazard across multiple jurisdictions and 2) compare the degree of risk of all hazards for each participating jurisdiction. Please note that annualized loss does not predict what losses will occur in any particular year. The estimated annualized losses are approximately \$209,529 per year (building and contents) for the County which represents a 61% increase of the estimated annual losses compared to the NYS analysis. Refer to Figure 5.4.5-13 for the annualized losses by municipality. Please note these annualized losses include the updated building stock inventory for Broome County which may account for the difference in annualized earthquake loss reported in the NYS HMP.

Figure 5.4.5-13. Annualized Earthquake Losses by County



Source: NYS HMP, 2011

Note: The black circle indicates the approximate location of the Broome County

According to NYCEM, where earthquake risks and mitigation were evaluated in the New York, New Jersey and Connecticut region, most damage and loss caused by an earthquake is directly or indirectly the result of ground shaking (NYCEM, 2003). NYCEM indicates there is a strong correlation between PGA and the damage a building might experience. The HAZUS-MH model is based on the best available earthquake science and aligns with these statements. HAZUS-MH 2.1 methodology and model were used to analyze the earthquake hazard for the general building stock for Broome County. See Figure 5.4.5-8 through Figure 5.4.5-10 earlier in this profile that illustrates the geographic distribution of PGA (g) across the County for 100-, 500- and 2,500-year MRP events at the Census-Tract level.

In addition, according to NYCEM, a building's construction determines how well it can withstand the force of an earthquake. The NYCEM report indicates that un-reinforced masonry buildings are most at risk during an earthquake because the walls are prone to collapse outward, whereas steel and wood buildings absorb more of the earthquake's energy. Additional attributes that contribute to a building's capability to withstand an earthquake's force include its age, number of stories and quality of construction. HAZUS-MH considers building construction and the age of buildings as part of the analysis. Because the default general building stock was used for this HAZUS-MH analysis, the default building ages and building types already incorporated into the inventory were used.

Potential building damage was evaluated by HAZUS-MH 2.1 across the following damage categories (none, slight, moderate, extensive and complete). Table 5.4.5-11 provides definitions of these five

categories of damage for a light wood-framed building; definitions for other building types are included in HAZUS-MH technical manual documentation. General building stock damage for these damage categories by occupancy class and building type on a County-wide basis is summarized for the 100-, 500- and 2,500-year events in Table 5.4.5-12, Table 5.4.5-13, and Table 5.4.5-14.

Table 5.4.5-11. Example of Structural Damage State Definitions for a Light Wood-Framed Building

Damage Category	Description
Slight	Small plaster or gypsum-board cracks at corners of door and window openings and wall-ceiling intersections; small cracks in masonry chimneys and masonry veneer.
Moderate	Large plaster or gypsum-board cracks at corners of door and window openings; small diagonal cracks across shear wall panels exhibited by small cracks in stucco and gypsum wall panels; large cracks in brick chimneys; toppling of tall masonry chimneys.
Extensive	Large diagonal cracks across shear wall panels or large cracks at plywood joints; permanent lateral movement of floors and roof; toppling of most brick chimneys; cracks in foundations; splitting of wood sill plates and/or slippage of structure over foundations; partial collapse of room-over-garage or other soft-story configurations.
Complete	Structure may have large permanent lateral displacement, may collapse, or be in imminent danger of collapse due to cripple wall failure or the failure of the lateral load resisting system; some structures may slip and fall off the foundations; large foundation cracks.

Source: HAZUS-MH Technical Manual

HAZUS-MH 2.1 estimates \$109,000 in damage to Broome County's general building stock as a result of a 100-year MRP event. Table 5.4.5-12 through Table 5.4.5-14 summarizes the damage estimated for the 100-, 500- and 2,500-year MRP earthquake events. Damage loss estimates include structural and non-structural damage to the building and loss of contents.

SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Table 5.4.5-12. Estimated Buildings Damaged by General Occupancy for 100-year, 500-year and 2,500-year MRP Earthquake Events

Category	Average Damage State														
	100-Year MRP				500-Year MRP				2,500-Year MRP						
	None	Slight	Moderate	Extensive	Complete	None	Slight	Moderate	Extensive	Complete	None	Slight	Moderate	Extensive	Complete
Residential	66,889	7	1	0	0	65,900	806	177	16	1	61,103	4,356	1,254	169	17
Commercial	4,803	1	0	0	0	4,691	85	25	3	0	4,150	409	206	35	4
Industrial	655	0	0	0	0	642	10	3	0	0	574	50	26	4	1
Education, Government, Religious and Agricultural	1,276	0	0	0	0	1,248	21	7	0	0	1,120	100	46	8	0

Source: HAZUS-MH2.1

Table 5.4.5-13. Estimated Number of Buildings Damaged by Building Type for 100-year, 500-year and 2,500-year MRP Earthquake Events

Category	Average Damage State														
	100-Year MRP				500-Year MRP				2,500-Year MRP						
	None	Slight	Moderate	Extensive	Complete	None	Slight	Moderate	Extensive	Complete	None	Slight	Moderate	Extensive	Complete
Wood	53,656	2	0	0	0	53,154	454	49	1	0	50,030	3,058	535	34	1
Steel	3,363	1	0	0	0	3,300	49	13	1	0	2,915	267	154	24	3
Concrete	1,541	0	0	0	0	1,513	22	6	0	0	1,354	115	62	9	1
Reinforced Masonry	1,270	0	0	0	0	1,241	19	9	1	0	1,130	75	54	11	0
Un-reinforced Masonry	10,958	2	1	0	0	10,540	300	106	14	1	9,180	1,108	546	112	15
Manufactured housing	2,835	4	1	0	0	2,731	79	29	1	0	2,337	292	180	29	3

Source: HAZUS-MH2.1



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Table 5.4.5-14. Estimated Building Value (Building and Contents) Damaged by the 500- and 2,500-Year MRP Earthquake Events

Municipality	Estimated Total Damages*		Percent of Total Building and Contents RV**		Estimated Residential Damage		Estimated Commercial Damage		
	Annualized Loss	500-Year	2,500-Year	500-Year	2,500-Year	500-Year	2,500-Year		
Barker (T)	\$766	\$61,315	\$782,406	0.01	0.2	\$35,855	\$383,756	\$10,802	\$137,661
Binghamton (C)	\$85,343	\$6,090,454	\$62,961,344	0.07	0.7	\$2,075,154	\$20,153,587	\$2,894,801	\$30,705,442
Binghamton (T)	\$1,581	\$126,231	\$1,643,054	0.01	0.2	\$69,725	\$811,793	\$39,465	\$537,587
Chenango (T)	\$3,649	\$306,876	\$3,732,088	0.02	0.2	\$161,392	\$1,797,600	\$103,380	\$1,332,787
Colesville (T)	\$2,095	\$171,842	\$2,124,074	0.02	0.2	\$71,474	\$781,738	\$60,301	\$790,920
Conklin (T)	\$2,318	\$185,987	\$2,399,938	0.02	0.2	\$74,393	\$817,586	\$78,425	\$1,029,673
Dickinson (T) and Port Dickinson (V)	\$1,894	\$158,302	\$1,932,373	0.02	0.2	\$76,419	\$869,689	\$47,174	\$602,311
Endicott (V)	\$15,794	\$1,180,234	\$12,328,386	0.04	0.5	\$462,227	\$4,436,249	\$429,080	\$4,671,072
Fenton (T)	\$5,508	\$461,197	\$5,622,182	0.02	0.2	\$180,121	\$2,026,549	\$89,773	\$1,160,305
Johnson City (V)	\$19,088	\$1,398,492	\$15,153,681	0.05	0.5	\$626,077	\$6,246,767	\$596,525	\$6,784,893
Kirkwood (T)	\$3,079	\$241,428	\$3,184,539	0.01	0.2	\$76,089	\$869,338	\$110,535	\$1,460,160
Lisle (T) and (V)	\$14,393	\$1,070,871	\$9,344,426	0.22	1.9	\$408,279	\$3,122,494	\$237,158	\$2,201,574
Maine (T)	\$2,425	\$198,032	\$2,493,033	0.01	0.2	\$62,797	\$695,676	\$120,361	\$1,568,863
Nanticoke (T)	\$797	\$65,626	\$812,385	0.01	0.2	\$17,567	\$178,760	\$43,194	\$564,106
Sanford (T) and Deposit (V)	\$1,414	\$101,562	\$1,555,006	0.01	0.1	\$31,118	\$427,130	\$63,417	\$995,979
Triangle (T) and Whitney Point (V)	\$2,305	\$185,241	\$2,340,976	0.02	0.2	\$37,878	\$408,904	\$116,312	\$1,500,578
Union (T)	\$36,008	\$2,829,679	\$27,949,117	0.05	0.5	\$1,450,548	\$13,500,612	\$981,637	\$9,997,987
Vestal (T)	\$8,396	\$695,825	\$8,654,814	0.01	0.2	\$344,867	\$3,946,452	\$256,551	\$3,391,330
Windsor (T) and (V)	\$2,676	\$207,738	\$2,758,164	0.01	0.2	\$94,117	\$1,104,003	\$70,636	\$981,942
Broome County	\$209,529	\$15,736,929	\$167,771,982	0.04	0.4	\$6,356,097	\$62,578,681	\$6,349,525	\$70,415,169

Source: HAZUS-MH 2.1

RV: Replacement Value

*Total is sum of damages for all occupancy classes (residential, commercial, industrial, agricultural, educational, religious and government).

**Total replacement value (building and contents) for the County is greater than \$42 billion.



It is estimated that there would be nearly \$16 million in damages to buildings in the County during a 500-year earthquake event. This includes structural damage, non-structural damage and loss of contents, representing less than one-percent of the total replacement value for general building stock in Broome County. For a 2,500-year MRP earthquake event, the estimated total building damage is greater than \$167 million, less than one-percent of the total general building stock replacement value (total replacement value is greater than \$42 billion for the County). Residential and commercial buildings account for most of the damage for earthquake events.

Earthquakes can cause secondary hazard events such as fires. No fires are anticipated as a result of the 100-, 500- or 2,500-year MRP events.

Impact on Critical Facilities

After considering the general building stock exposed to, and damaged by, 100-, 500- and 2,500-year MRP earthquake events, critical facilities were evaluated. All critical facilities (essential facilities, transportation systems, lifeline utility systems, high-potential loss facilities and user-defined facilities) in Broome County are considered exposed and vulnerable to the earthquake hazard. Refer to subsection “Critical Facilities” in Section 4 (County Profile) of this Plan for a complete inventory of critical facilities in the County.

HAZUS-MH 2.1 estimates the probability that critical facilities may sustain damage as a result of 100-, 500- and 2,500-year MRP earthquake events. Additionally, HAZUS-MH estimates percent functionality for each facility days after the event. For the 100-Year MRP event, HAZUS-MH 2.1 estimates it is 99% probable that emergency facilities (police, fire, EMS and medical facilities), schools and specific facilities identified by Broome County as critical (i.e., user-defined facilities such shelters, municipal buildings and Departments of Public Works) will not experience any structural damage. These facilities are estimated to be nearly 100% functional on day one of the 100-year MRP earthquake event. Therefore, the impact to critical facilities is not significant for the 100-year event.

Table 5.4.5-15 and Table 5.4.5-16 list the percent probability of critical facilities sustaining the damage category as defined by the column heading and percent functionality after the event for the 500-year and 2,500-year MRP earthquake events.

SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Table 5.4.5-15. Estimated Damage and Loss of Functionality for Critical Facilities in Broome County for the 500- Year MRP Earthquake Event

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Chenango Forks	Barker (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
CHARLOTTE KENYON ES	Barker (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Barker Highway Garage	Barker (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Barker Town Hall	Barker (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Chenango Forks Post Office	Barker (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
OUR LADY OF LOURDES HOSPITAL	Binghamton (C)	Medical	99.2	0.6	0.1	0	0	99.2	99.8	99.9	99.9
UNITED HEALTH/BINGHAMTON GENERAL	Binghamton (C)	Medical	99.2	0.6	0.1	0	0	99.2	99.8	99.9	99.9
Binghamton Police Station	Binghamton (C)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Liberty Street Sub Station	Binghamton (C)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Headquarter	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Engine 1	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Engine 4	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Quint 2	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Quint 3	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City of Binghamton Engine 6	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
City Training Center/Mechanics Facility	Binghamton (C)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Superior	Binghamton (C)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Broome Volunteer ES	Binghamton (C)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
CALVIN COOLIDGE SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BENJAMIN FRANKLIN ES	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
THOMAS JEFFERSON SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
MACARTHUR SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
THEODORE ROOSEVELT SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
WOODROW WILSON SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
EAST MS	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
WEST MS	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BINGHAMTON HS	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
HORACE MANN SCHOOL	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Ridley Lowel Business & T echnical Inst	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
171-177 Clinton Street	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Alfred Dunk House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
American Legion Post 1645	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BC Public Library - Central Library	Binghamton (C)	Library	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton City Hall	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton Main Post Office	Binghamton (C)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Broome County Courthouse	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Broome County Library, Decker Room	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Bundy House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Carlisle Apts Management Building	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Catholic Charities	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Christ Church	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Community Center	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Conklin Avenue First Baptist Church	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Cross Point Community Church	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
East Side Post Office	Binghamton (C)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Emmanuel Church of the Evangelical Assoc	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Fairview-Good Shepard Home	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
First Ward Senior Citizens Center	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
General Edward F. Jones House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
George F. Johnson Recreation PkCarousel	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Holy Spirit Church Recreation Hall	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
J. Stewart Wells House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
John T. Whitmore House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Jonas M. Klimer House	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Knights of Columbus	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
New York State Inebriate Asylum	Binghamton (C)	Historic	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Phelps Mansion	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Roberson Mansion	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Ross Memorial Church	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Ross Park Carousel	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint John The Evangelist Church	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Patricks Parish Center Lobby	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Thomas Aquinas Church	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Saints Cyril Methodius Slovak Roman	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saratoga Apartments Community Room	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Sgt. Peters Carrier Annex	Binghamton (C)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
South Washington St Parabolic Bridge	Binghamton (C)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Southview Post Office	Binghamton (C)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Temple Concord	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
The Forum	Binghamton (C)	Community	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Trinity House	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Unitarian Universalist Congregation	Binghamton (C)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Westview Post Office	Binghamton (C)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
DOT Facility	Binghamton (C)	DOT	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
DOT Facility	Binghamton (C)	DOT	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Boulevard United Methodist Church	Binghamton (C)	Poll/Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Benjamin Franklin Elementary School	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Trinity Memorial Church	Binghamton (C)	Shelter/Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
High Street United Methodist Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Mary's Recreation Center	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Patricks Parish Center	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Woodrow Wilson Elementary School	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Cyril Methodist Church Hall	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Seton Catholic Central High School	Binghamton (C)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Fairview United Methodist Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Christ Episcopal Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Conklin Avenue First Baptist Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
East Side Congregational Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Middle School	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Tabernacle United Methodist Church	Binghamton (C)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Presbyterian Church	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton High School	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BC Veterans Memorial Arena	Binghamton (C)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Theodore Roosevelt Elementary School	Binghamton (C)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton University	Binghamton (C)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality						
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90			
	Nestal (T)													
Town of Binghamton Station 1	Binghamton (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Town of Binghamton Station 2	Binghamton (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Town of Binghamton Station 3	Binghamton (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
BROOKSIDE ES	Binghamton (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Binghamton Town Hall	Binghamton (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Hawleyton United Methodist Church	Binghamton (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Old Hawleyton Church	Binghamton (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	99.9	99.9	
Town Community Center	Binghamton (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Town of Chenango Command Center	Chenango (C)	EOC	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Broome County Highway Garage	Chenango (C)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Chenango Bridge Station 1	Chenango (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Chenango Bridge Station 2	Chenango (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Chenango Fire Station 1	Chenango (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Chenango Fire Station 2	Chenango (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Chenango Ambulance	Chenango (T)	Ambulance	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
JOHN R. HARSHAW PRIMARY SCHOOL	Chenango (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
CHENANGO FORKS HS	Chenango (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
CHENANGO FORKS MS	Chenango (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
CHENANGO BRIDGE ES	Chenango (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
CENTRAL BAPTIST CHRISTIAN ACADEMY	Chenango (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Castle Creek Post Office	Chenango (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Chenango Bridge Post Office	Chenango (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Chenango Town Hall	Chenango (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Kattelville Athletic	Chenango (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
DOT Facility	Chenango (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Chenango Bridge Methodist Church	Chenango (T)	Shelter/Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Valley Christian Reformed Church	Chenango (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	99.9	99.9	
Harpursville Station 1	Colesville (T)	Fire	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9	99.9	99.9	
Sanitaria Springs	Colesville (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
West Colesville	Colesville (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	99.9	99.9	
Ouaquaga	Colesville (T)	Fire	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9	99.9	99.9	



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Harpurville Station 2	Colesville (T)	Fire	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9
Colesville Volunteer ES	Colesville (T)	Ambulance	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9
W.A. OLMSTED ES	Colesville (T)	School	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9
HARPURVILLE JSHS	Colesville (T)	School	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9
Colesville Town Hall	Colesville (T)	Poll	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Colesville Volunteer Ambulance Squad	Colesville (T)	Poll	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Harpurville Post Office	Colesville (T)	Post Office	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Harpurville United Methodist Church	Colesville (T)	Historic	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Nineveh Post Office	Colesville (T)	Post Office	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Nineveh Public Library	Colesville (T)	Library	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Ouaquaga Lenticular Truss Bridge	Colesville (T)	Historic	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Tunnel Post Office	Colesville (T)	Post Office	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
DOT Facility	Colesville (T)	DOT	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
W.A. Olmsted Elementary School	Colesville (T)	Shelter	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Nineveh Presbyterian Church	Colesville (T)	Shelter	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Conklin Station 1	Conklin (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Conklin Station 3	Conklin (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Conklin Station 2	Conklin (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Conklin Station 1	Conklin (T)	EOC	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Conklin Town Hall	Conklin (T)	EOC	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
F.P. DONNELLY SCHOOL	Conklin (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
RICHARD T. STANK JHS	Conklin (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
SUSQUEHANNA VALLEY SHS	Conklin (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Conklin Community Center	Conklin (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Conklin Post Office	Conklin (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Conklin Town Hall	Conklin (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Corbettville Post Office	Conklin (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Town of Conklin Highway Garage	Conklin (T)	Public Works	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Susquehanna Valley High School	Conklin (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Conklin Forks United Methodist Church	Conklin (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Conklin Presbyterian Church	Conklin (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Village of Deposit Police	Deposit (V)	Police	95.4	3.4	1.1	0.1	0	95.3	98.6	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Deposit Free Librar	Deposit (V)	Library	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Deposit Post Office	Deposit (V)	Post Office	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Deposit Village Hall	Deposit (V)	Municipal Hall	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Sanford Town Hall	Deposit (V)	Poll	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
State Theater	Deposit (V)	Historic	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Sheriff's Office	Dickinson (T)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Prospect Terrace	Dickinson (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Broome County Public Safety Facility	Dickinson (T)	EOC	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
BOCES	Dickinson (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Broome Community College	Dickinson (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Dickinson Town Hall	Dickinson (T)	Municipal Hall	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Sunrise Terrace Community Center	Dickinson (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BOCES	Dickinson (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Nimmonsburg United Methodist Church	Dickinson (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Endicott Command Center	Endicott (V)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endicott Police Station	Endicott (V)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endicott	Endicott (V)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Huron Emergency Services	Endicott (V)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Volunteer ES	Endicott (V)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
JENNIE F. SNAPP MS	Endicott (V)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
UNION ENDICOTT HS	Endicott (V)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BOCES Endicott Learning Center	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Central Methodist Church	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endicott Post Office	Endicott (V)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endicott Square Deal Arch	Endicott (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endicott Village Hall	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
George F. Johnson Memorial Library	Endicott (V)	Library	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
George W. Johnson Park Carousel	Endicott (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Riverside Cemetery	Endicott (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Ambrose School	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saint Anthony's School	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Saints Peter and Paul Church	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90	
Sons of Italy Hall	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
U.S. Post Office - Endicott	Endicott (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Union Presbyterian Church Education Bldg	Endicott (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Union Station	Endicott (V)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Central United Methodist Church	Endicott (V)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Union-Endicott High School	Endicott (V)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Holy Nativity Lutheran Church	Endicott (V)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Sheriff Hillcrest substation	Fenton (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
NYSP Crime Lab	Fenton (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
NYS Park Police Chen Valley St Park	Fenton (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
Port Crane Station 1	Fenton (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
Port Crane Station 2	Fenton (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
Hillcrest	Fenton (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
CHENANGO VALLEY JSHS	Fenton (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9	
Fenton Free Library	Fenton (T)	Library	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Fenton Town Hall	Fenton (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Hillcrest Depot	Fenton (T)	Public Works	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Nat. Defense Stockpile Ctr/StoneSpillway	Fenton (T)	Historic	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Port Crane Post Office	Fenton (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
DOT Facility	Fenton (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Children's Home Wyoming Conference	Fenton (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Binghamton First Church of Nazarene	Fenton (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9	
Johnson City Command Center	Johnson City (V)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
UNITED HEALTH/WILSON HOSPITAL	Johnson City (V)	Medical	99.2	0.6	0.1	0	0	99.2	99.8	99.9	99.9	
Johnson City Police Station	Johnson City (V)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
JCPD - Oakdale Mall Sub Station	Johnson City (V)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Johnson City Station 1	Johnson City (V)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Johnson City Station 2	Johnson City (V)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Union Volunteer ES	Johnson City (V)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
JOHNSON CITY SHS	Johnson City (V)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
JOHNSON CITY MS ES	Johnson City (V)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	
Davis College	Johnson City (V)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9	



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Bible School Park Post Office	Johnson City (V)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
C. Fred Johnson Park Carousel	Johnson City (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Family Enrichment Network	Johnson City (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Goodwill Theatre	Johnson City (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Johnson City Post Office	Johnson City (V)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Johnson City Square Deal Arch	Johnson City (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Johnson City Village Hall	Johnson City (V)	Municipal Hall	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Knights of Columbus Banquet Room	Johnson City (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Primitive Methodist Church	Johnson City (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
SEPP Harry L Dr Apartments	Johnson City (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
U.S. Post Office - Johnson City	Johnson City (V)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Volunteer Emergency Squad	Johnson City (V)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Your Home Public Library	Johnson City (V)	Library/Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Johnson City Senior Center	Johnson City (V)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
All Saints Episcopal Church	Johnson City (V)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
NYS Police Kirkwood Barricks	Kirkwood (T)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Kirkwood Station 1	Kirkwood (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Kirkwood Station 2	Kirkwood (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Five Mile Point Station 1	Kirkwood (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Five Mile Point Station 2	Kirkwood (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Kirkwood Code Office	Kirkwood (T)	EOC	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
FLOYD BELL ES	Kirkwood (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
C.R. WEEKS ES	Kirkwood (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Kirkwood Code Office	Kirkwood (T)	CodeOffice	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Kirkwood Post Office	Kirkwood (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Kirkwood Town Hall	Kirkwood (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
DOT Facility	Kirkwood (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
DOT Facility	Kirkwood (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Town of Kirkwood Highway Garage	Kirkwood (T)	Public Works	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Kirkwood United Methodist Church	Kirkwood (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Saint Mary's Parish Center	Kirkwood (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Killawog	Lisle (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Lisle	Lisle (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Killawog Post Office	Lisle (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Lisle Town Hall	Lisle (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Lisle Free Library	Lisle (V)	Library	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Lisle Post Office	Lisle (V)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Lisle Village Hall	Lisle (V)	Municipal Hall	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Maine	Maine (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
East Maine	Maine (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Airport CFR	Maine (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine Ambulance	Maine (T)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
MAINE MEMORIAL SCHOOL	Maine (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
American Legion Post 1390	Maine (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine Central School	Maine (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine Post Office	Maine (T)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine Town Hall	Maine (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine Town Hall	Maine (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Most Holy Rosary Parish	Maine (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Maine-Endwell Bus Garage	Maine (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Glen Aubrey	Nanticoke (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Nanticoke	Nanticoke (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Glen Aubrey Post Office	Nanticoke (T)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Nanticoke Town Hall	Nanticoke (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Port Dickinson Police Station	Port Dickinson (V)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Port Dickinson	Port Dickinson (V)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
PORT DICKINSON ES	Port Dickinson (V)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Port Dickinson Community Church	Port Dickinson (V)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Port Dickinson Village Hall	Port Dickinson (V)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Sanford Community House	Sanford (T)	Poll	95.4	3.4	1.1	0.1	0	95.3	98.7	99.8	99.9
Triangle	Triangle (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
WHITNEY POINT IS	Triangle (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
WHITNEY POINT MS	Triangle (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
WHITNEY POINT SHS	Triangle (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
CARYL E. ADAMS PRIMARY SCHOOL	Triangle (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
DOT Facility	Triangle (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Caryl E. Adams Primary School	Triangle (T)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Union Command Center	Union (T)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Sherriff - Endwell Sub Station	Union (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
NYS Police Endwell Barricks	Union (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
West Corners Station 1	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Station 1	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Station 2	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Station 3	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Endicott	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Center Station 1	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Center Station 2	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Choconut Center	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Corners Station 2	Union (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Volunteer ES	Union (T)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
HOMER BRINK SCHOOL	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
MAINE-ENDWELL MS	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
MAINE-ENDWELL SHS	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
CHARLES F. JOHNSON, JR. ES	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
ANN G. MCGUINNESS IS	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
GEORGE F JOHNSON	Union (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Branch	Union (T)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Church of Christ	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Endwell Methodist Church	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
First Baptist Church of Johnson City	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Highland Park Carousel	Union (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Highland Park Gym	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Johnson City YMCA	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Northminster Presbyterian Church	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Our Saviour Lutheran Church	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Highway Garage	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Union Town Hall	Union (T)	Municipal Hall	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Washingtonian Hall	Union (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Corners Fire Station 1	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Endicott Fire Station	Union (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
West Endicott Park Carousel	Union (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Linnaeus W. West Primary School	Union (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Our Lady of Good Counsel Parish	Union (T)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Chester J. Jaskiewicz AmLegion Post 1305	Union (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Union Center Christian Church	Union (T)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Church of the Holy Family	Union (T)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal EOC	Vestal (T)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton University Health Services	Vestal (T)	Medical	99.2	0.6	0.1	0	0	99.2	99.8	99.9	99.9
Vestal Police Station	Vestal (T)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
VPD Sub Station	Vestal (T)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
NYS University Police Bing University	Vestal (T)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Company 1	Vestal (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Company 2	Vestal (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Company 3	Vestal (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Company 4	Vestal (T)	Fire	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Volunteer ES	Vestal (T)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Harpur's Ferry SVAS	Vestal (T)	Ambulance	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Binghamton Univ PoliceStation/Admin Bldg	Vestal (T)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Company 4	Vestal (T)	EOC	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
AFRICAN ROAD ES	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
CLAYTON AVE ES	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
GLENWOOD ES	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
VESTAL HILLS ES	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
VESTAL MS	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
VESTAL SHS	Vestal (T)	School	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
American Legion Post 89	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BU Post Office	Vestal (T)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
BU Student Union Lobby	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Calvary Methodist Church	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Drovers Inn	Vestal (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Evangelical Free Church	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Grace Lutheran Church	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Jewish Community Center	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Mormon Church of Latter Day Saints	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Rounds House	Vestal (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Seventh-Day Adventist Church	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Center Methodist Church	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Central High School	Vestal (T)	Historic	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Post Office	Vestal (T)	Post Office	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Public Library	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Public Library	Vestal (T)	Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal Town Hall	Vestal (T)	Municipal Hall	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
DOT Facility	Vestal (T)	DOT	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Ross Corners Christian Academy	Vestal (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Vestal United Methodist Church	Vestal (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Memorial Park Baptist Church	Vestal (T)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
John Handle American Legion Post 89	Vestal (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Calvary Baptist Tabernacle Church	Vestal (T)	Shelter	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Valleyview Alliance Church	Vestal (T)	Shelter/Poll	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
NYS Police Whitney Point Barricks	Whitney Point (V)	Police	95.7	3.1	1	0.1	0	95.7	98.8	99.8	99.9
Whitney Point	Whitney Point (V)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Grace Episcopal Church	Whitney Point (V)	Historic	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Mary Wilcox Memorial Library	Whitney Point (V)	Library	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Triangle Town Hall	Whitney Point (V)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Whitney Point Post Office	Whitney Point (V)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Whitney Point Village Hall	Whitney Point (V)	Municipal Hall	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Whitney Point United Methodist Church	Whitney Point (V)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Sheriff Windsor substation	Windsor (T)	Police	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
West Windsor	Windsor (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Windsor Station 2	Windsor (T)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
West Windsor Ambulance	Windsor (T)	Ambulance	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
WINDSOR CENTRAL HS	Windsor (T)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
West Windsor Baptist Church	Windsor (T)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
DOT Facility	Windsor (T)	DOT	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor Station 1	Windsor (V)	Fire	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Windsor Ambulance	Windsor (V)	Ambulance	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
A.F. PALMER ES / WINDSOR CENTR	Windsor (V)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
WINDSOR CENTRAL MS	Windsor (V)	School	95.6	3.3	1	0.1	0	95.5	98.7	99.8	99.9
Jedediah Hotchkiss House	Windsor (V)	Historic	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor Community House	Windsor (V)	Poll	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor Post Office	Windsor (V)	Post Office	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor Town Hall	Windsor (V)	Municipal Hall	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor Village Hall	Windsor (V)	Municipal Hall	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Windsor United Methodist Church	Windsor (V)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9
Alice Freeman Palmer Elem School	Windsor (V)	Shelter	95.6	3.3	1	0.1	0	95.5	98.8	99.8	99.9

Source: HAZUS-MH 2.1



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Table 5.4.5-16. Estimated Damage and Loss of Functionality for Critical Facilities in Broome County for the 2,500-Year MRP Earthquake Event

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Chenango Forks	Barker (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
CHARLOTTE KENYON ES	Barker (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Barker Highway Garage	Barker (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Barker Town Hall	Barker (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Chenango Forks Post Office	Barker (T)	Post Office	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
OUR LADY OF LOURDES HOSPITAL	Binghamton (C)	Medical	83.3	10.8	5.3	0.4	0.1	83.2	93.8	99.3
UNITED HEALTH/BINGHAMTON GENERAL	Binghamton (C)	Medical	83.3	10.8	5.3	0.4	0.1	83.2	93.8	99.3
Binghamton Police Station	Binghamton (C)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Liberty Street Sub Station	Binghamton (C)	Police	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
City of Binghamton Headquarter	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City of Binghamton Engine 1	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City of Binghamton Engine 4	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City of Binghamton Quint 2	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City of Binghamton Quint 3	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City of Binghamton Engine 6	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
City Training Center/Mechanics Facility	Binghamton (C)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Superior	Binghamton (C)	Ambulance	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Broome Volunteer ES	Binghamton (C)	Ambulance	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
CALVIN COOLIDGE SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
BENJAMIN FRANKLIN ES	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
THOMAS JEFFERSON SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
MACARTHUR SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
THEODORE ROOSEVELT SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
WOODROW WILSON SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
EAST MS	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
WEST MS	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
BINGHAMTON HS	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
HORACE MANN SCHOOL	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Ridley Lowell Business & Technical Inst	Binghamton (C)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
171-177 Clinton Street	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage					Percent Functionality			
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Alfred Dunk House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
American Legion Post 1645	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
BC Public Library - Central Library	Binghamton (C)	Library	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Binghamton City Hall	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Binghamton Main Post Office	Binghamton (C)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Broome County Courthouse	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Broome County Library, Decker Room	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Bundy House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Carlisle Apts Management Building	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Catholic Charities	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Christ Church	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Community Center	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Conklin Avenue First Baptist Church	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Cross Point Community Church	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
East Side Post Office	Binghamton (C)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Emmanuel Church of the Evangelical Assoc	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Fairview-Good Shepard Home	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
First Ward Senior Citizens Center	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
General Edward F. Jones House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
George F. Johnson Recreation PkCarousel	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Holy Spirit Church Recreation Hall	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
J. Stewart Wells House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
John T. Whitmore House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Jonas M. Kilmer House	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Knights of Columbus	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
New York State Inebriate Asylum	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Phelps Mansion	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Roberson Mansion	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Ross Memorial Church	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Ross Park Carousel	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saint John The Evangelist Church	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Saint Patricks Parish Center Lobby	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saint Thomas Aquinas Church	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saints Cyril Methodius Slovak Roman	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saratoga Apartments Community Room	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Sgt. Peters Carrier Annex	Binghamton (C)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
South Washington St Parabolic Bridge	Binghamton (C)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Southview Post Office	Binghamton (C)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Temple Concord	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
The Forum	Binghamton (C)	Community	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Trinity House	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Unitarian Universalist Congregation	Binghamton (C)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Westview Post Office	Binghamton (C)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
DOT Facility	Binghamton (C)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
DOT Facility	Binghamton (C)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Boulevard United Methodist Church	Binghamton (C)	Shelter/Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Benjamin Franklin Elementary School	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Trinity Memorial Church	Binghamton (C)	Shel/Hist	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
High Street United Methodist Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saint Mary's Recreation Center	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saint Patricks Parish Center	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Woodrow Wilson Elementary School	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Saint Cyril Methodist Church Hall	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Seton Catholic Central High School	Binghamton (C)	Shelter/Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Fairview United Methodist Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Christ Episcopal Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Conklin Avenue First Baptist Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
East Side Congregational Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
West Middle School	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Tabernacle United Methodist Church	Binghamton (C)	Shelter/Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
West Presbyterian Church	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Binghamton High School	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
BC Veterans Memorial Arena	Binghamton (C)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Theodore Roosevelt Elementary School	Binghamton (C)	Shelter/Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Binghamton University	Binghamton (C) /Vestal (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Town of Binghamton Station 1	Binghamton (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Town of Binghamton Station 2	Binghamton (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Town of Binghamton Station 3	Binghamton (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
BROOKSIDE ES	Binghamton (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Binghamton Town Hall	Binghamton (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Hawleyton United Methodist Church	Binghamton (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Old Hawleyton Church	Binghamton (T)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Town Community Center	Binghamton (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Town of Chenango Command Center	Chenango (T)	EOC	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Broome County Highway Garage	Chenango (T)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Chenango Bridge Station 1	Chenango (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Chenango Bridge Station 2	Chenango (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Chenango Fire Station 1	Chenango (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Chenango Fire Station 2	Chenango (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Chenango Ambulance	Chenango (T)	Ambulance	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
JOHN R. HARSHAW PRIMARY SCHOOL	Chenango (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
CHENANGO FORKS HS	Chenango (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
CHENANGO FORKS MS	Chenango (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
CHENANGO BRIDGE ES	Chenango (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
CENTRAL BAPTIST CHRISTIAN ACADEMY	Chenango (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Castle Creek Post Office	Chenango (T)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Chenango Bridge Post Office	Chenango (T)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Chenango Town Hall	Chenango (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Kattelville Athletic	Chenango (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
DOT Facility	Chenango (T)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Chenango Bridge Methodist Church	Chenango (T)	Shelter/Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Valley Christian Reformed Church	Chenango (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Harpurville Station 1	Colesville (T)	Fire	79	13.2	6.5	1.2	0.1	78.9	91.8	98.6



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage					Percent Functionality			
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Sanitaria Springs	Colesville (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
West Colesville	Colesville (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Ouaquaga	Colesville (T)	Fire	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
Harpursville Station 2	Colesville (T)	Fire	79.4	12.9	6.3	1.2	0.1	79.4	92	98.6
Colesville Volunteer ES	Colesville (T)	Ambulance	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
W.A. OLMSTED ES	Colesville (T)	School	79	13.2	6.5	1.2	0.1	78.9	91.8	98.6
HARPURSVILLE JSHS	Colesville (T)	School	79	13.2	6.5	1.2	0.1	78.9	91.8	98.6
Colesville Town Hall	Colesville (T)	Poll	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Colesville Volunteer Ambulance Squad	Colesville (T)	Poll	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Harpursville Post Office	Colesville (T)	Post Office	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Harpursville United Methodist Church	Colesville (T)	Historic	79	13.2	6.5	1.2	0.1	78.9	92.1	98.6
Nineveh Post Office	Colesville (T)	Post Office	79	13.2	6.5	1.2	0.1	78.9	92.1	98.6
Nineveh Public Library	Colesville (T)	Library	79	13.2	6.5	1.2	0.1	78.9	92.1	98.6
Ouaquaga Lenticular Truss Bridge	Colesville (T)	Historic	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Tunnel Post Office	Colesville (T)	Post Office	79.4	12.9	6.3	1.2	0.1	79.4	92.3	98.6
DOT Facility	Colesville (T)	DOT	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
W.A. Olmsted Elementary School	Colesville (T)	Shelter	79	13.2	6.5	1.2	0.1	78.9	92.1	98.6
Nineveh Presbyterian Church	Colesville (T)	Shelter	79	13.2	6.5	1.2	0.1	78.9	92.1	98.6
Conklin Station 1	Conklin (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Conklin Station 3	Conklin (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Conklin Station 2	Conklin (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Conklin Station 1	Conklin (T)	EOC	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Conklin Town Hall	Conklin (T)	EOC	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
F.P. DONNELLY SCHOOL	Conklin (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
RICHARD T. STANK JHS	Conklin (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
SUSQUEHANNA VALLEY SHS	Conklin (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Conklin Community Center	Conklin (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Conklin Post Office	Conklin (T)	Post Office	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Conklin Town Hall	Conklin (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Corbettsville Post Office	Conklin (T)	Post Office	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Town of Conklin Highway Garage	Conklin (T)	Public Works	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Susquehanna Valley High School	Conklin (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Conklin Forks United Methodist Church	Conklin (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Conklin Presbyterian Church	Conklin (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Village of Deposit Police	Deposit (V)	Police	77.9	13.7	6.9	1.3	0.2	77.8	91.2	98.4
Deposit Free Librar	Deposit (V)	Library	77.9	13.7	6.9	1.3	0.2	77.8	91.5	98.4
Deposit Post Office	Deposit (V)	Post Office	77.7	13.8	7	1.4	0.2	77.6	91.4	98.4
Deposit Village Hall	Deposit (V)	Municipal Hall	77.9	13.7	6.9	1.3	0.2	77.8	91.5	98.4
Sanford Town Hall	Deposit (V)	Poll	77.7	13.8	7	1.4	0.2	77.6	91.4	98.4
State Theater	Deposit (V)	Historic	77.9	13.7	6.9	1.3	0.2	77.8	91.5	98.4
Sheriff's Office	Dickinson (T)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Prospect Terrace	Dickinson (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Broome County Public Safety Facility	Dickinson (T)	EOC	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
BOCES	Dickinson (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Broome Community College	Dickinson (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Dickinson Town Hall	Dickinson (T)	Municipal Hall	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Sunrise Terrace Community Center	Dickinson (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
BOCES	Dickinson (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Nimmonsburg United Methodist Church	Dickinson (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Endicott Command Center	Endicott (V)	EOC	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Endicott Police Station	Endicott (V)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Endicott	Endicott (V)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Huron Emergency Services	Endicott (V)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Union Volunteer ES	Endicott (V)	Ambulance	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
JENNIE F. SNAPP MS	Endicott (V)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
UNION ENDICOTT HS	Endicott (V)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
BOCES Endicott Learning Center	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Central Methodist Church	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Endicott Post Office	Endicott (V)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Endicott Square Deal Arch	Endicott (V)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Endicott Village Hall	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
George F. Johnson Memorial Library	Endicott (V)	Library	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
George W. Johnson Park Carousel	Endicott (V)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Riverside Cemetery	Endicott (V)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Saint Ambrose School	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Saint Anthony's School	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Saints Peter and Paul Church	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Sons of Italy Hall	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
U.S. Post Office - Endicott	Endicott (V)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Union Presbyterian Chruch Education Bldg	Endicott (V)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Union Station	Endicott (V)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Central United Methodist Church	Endicott (V)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Union-Endicott High School	Endicott (V)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Holy Nativity Lutheran Church	Endicott (V)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Sheriff Hillcrest substation	Fenton (T)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
NYSP Crime Lab	Fenton (T)	Police	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
NYS Park Police Chen Valley St Park	Fenton (T)	Police	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Port Crane Station 1	Fenton (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Port Crane Station 2	Fenton (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Hillcrest	Fenton (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
CHENANGO VALLEY JSHS	Fenton (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Fenton Free Library	Fenton (T)	Library	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Fenton Town Hall	Fenton (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Hillcrest Depot	Fenton (T)	Public Works	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Nat. Defense Stockpile CtrStoneSpillway	Fenton (T)	Historic	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Port Crane Post Office	Fenton (T)	Post Office	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
DOT Facility	Fenton (T)	DOT	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Children's Home Wyoming Conference	Fenton (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Binghamton First Church of Nazarene	Fenton (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Johnson City Command Center	Johnson City (V)	EOC	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
UNITED HEALTH/WILSON HOSPITAL	Johnson City (V)	Medical	83.3	10.8	5.3	0.4	0.1	83.2	93.8	99.3
Johnson City Police Station	Johnson City (V)	Police	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
JCPD - Oakdale Mall Sub Station	Johnson City (V)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Johnson City Station 1	Johnson City (V)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Johnson City Station 2	Johnson City (V)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Union Volunteer ES	Johnson City (V)	Ambulance	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
JOHNSON CITY SHS	Johnson City (V)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
JOHNSON CITY MS ES	Johnson City (V)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Davis College	Johnson City (V)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Bible School Park Post Office	Johnson City (V)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
C. Fred Johnson Park Carousel	Johnson City (V)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Family Enrichment Network	Johnson City (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Goodwill Theatre	Johnson City (V)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Johnson City Post Office	Johnson City (V)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Johnson City Square Deal Arch	Johnson City (V)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Johnson City Village Hall	Johnson City (V)	Municipal Hall	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Knights of Columbus Banquet Room	Johnson City (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Primitive Methodist Church	Johnson City (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
SEPP Harry L Dr Apartments	Johnson City (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
U.S. Post Office - Johnson City	Johnson City (V)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Union Volunteer Emergency Squad	Johnson City (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Your Home Public Library	Johnson City (V)	Library/Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Johnson City Senior Center	Johnson City (V)	Shelter/Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
All Saints Episcopal Church	Johnson City (V)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
NYS Police Kirkwood Barricks	Kirkwood (T)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Kirkwood Station 1	Kirkwood (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Kirkwood Station 2	Kirkwood (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Five Mile Point Station 1	Kirkwood (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Five Mile Point Station 2	Kirkwood (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Kirkwood Code Office	Kirkwood (T)	EOC	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
FLOYD BELL ES	Kirkwood (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
C.R. WEEKS ES	Kirkwood (T)	School	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Kirkwood Code Office	Kirkwood (T)	CodeOffice	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Kirkwood Post Office	Kirkwood (T)	Post Office	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Kirkwood Town Hall	Kirkwood (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
DOT Facility	Kirkwood (T)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
DOT Facility	Kirkwood (T)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Town of Kirkwood Highway Garage	Kirkwood (T)	Public Works	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Kirkwood United Methodist Church	Kirkwood (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Saint Mary's Parish Center	Kirkwood (T)	Shelter	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
Killawog	Lisle (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Lisle	Lisle (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Killawog Post Office	Lisle (T)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Lisle Town Hall	Lisle (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Lisle Free Library	Lisle (V)	Library	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Lisle Post Office	Lisle (V)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Lisle Village Hall	Lisle (V)	Municipal Hall	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Maine	Maine (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
East Maine	Maine (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Airport CFR	Maine (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Maine Ambulance	Maine (T)	Ambulance	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
MAINE MEMORIAL SCHOOL	Maine (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
American Legion Post 1390	Maine (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Maine Central School	Maine (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Maine Post Office	Maine (T)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Maine Town Hall	Maine (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Maine Town Hall	Maine (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Most Holy Rosary Parish	Maine (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Maine-Endwell Bus Garage	Maine (T)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Glen Aubrey	Nanticoke (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Nanticoke	Nanticoke (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Glen Aubrey Post Office	Nanticoke (T)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Nanticoke Town Hall	Nanticoke (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Port Dickinson Police Station	Port Dickinson (V)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Port Dickinson	Port Dickinson (V)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
PORT DICKINSON ES	Port Dickinson (V)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Port Dickinson Community Church	Port Dickinson (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Port Dickinson Village Hall	Port Dickinson (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Sanford Community House	Sanford (T)	Poll	78.1	13.6	6.8	1.3	0.2	78.1	91.6	98.5



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Triangle	Triangle (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
WHITNEY POINT IS	Triangle (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
WHITNEY POINT MS	Triangle (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
WHITNEY POINT SHS	Triangle (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
CARYL E. ADAMS PRIMARY SCHOOL	Triangle (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
DOT Facility	Triangle (T)	DOT	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Caryl E. Adams Primary School	Triangle (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Union Command Center	Union (T)	EOC	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Sheriff - Endwell Sub Station	Union (T)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
NYS Police Endwell Barricks	Union (T)	Police	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
West Corners Station 1	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Endwell Station 1	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Endwell Station 2	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Endwell Station 3	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
West Endicott	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Union Center Station 1	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Union Center Station 2	Union (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Choconut Center	Union (T)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
West Corners Station 2	Union (T)	Fire	80.3	12.5	6	1.1	0.1	80.3	92.5	98.7
Union Volunteer ES	Union (T)	Ambulance	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
HOMER BRINK SCHOOL	Union (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
MAINE-ENDWELL MS	Union (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
MAINE-ENDWELL SHS	Union (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
CHARLES F. JOHNSON, JR. ES	Union (T)	School	80.3	12.5	6	1.1	0.1	80.3	92.5	98.7
ANN G. MCGUINNESS IS	Union (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
GEORGE F JOHNSON	Union (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Endwell Branch	Union (T)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Endwell Church of Christ	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Endwell Methodist Church	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
First Baptist Church of Johnson City	Union (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Highland Park Carousel	Union (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Highland Park Gym	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Johnson City YMCA	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Northminster Presbyterian Church	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Our Saviour Lutheran Church	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Union Highway Garage	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Union Town Hall	Union (T)	Municipal Hall	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Washingtonian Hall	Union (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
West Corners Fire Station 1	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
West Endicott Fire Station	Union (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
West Endicott Park Carousel	Union (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Linnaeus W. West Primary School	Union (T)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Our Lady of Good Counsel Parish	Union (T)	Shelter/Poll	80.3	12.5	6	1.1	0.1	80.3	92.7	98.7
Chester J Jaskiewicz AmLegion Post 1305	Union (T)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Union Center Christian Church	Union (T)	Shelter/Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Church of the Holy Family	Union (T)	Shelter/Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal EOC	Vestal (T)	EOC	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Binghamton University Health Services	Vestal (T)	Medical	83.3	10.8	5.3	0.4	0.1	83.2	93.8	99.3
Vestal Police Station	Vestal (T)	Police	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
VPD Sub Station	Vestal (T)	Police	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
NYS University Police Bing University	Vestal (T)	Police	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Vestal Company 1	Vestal (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Vestal Company 2	Vestal (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Vestal Company 3	Vestal (T)	Fire	80.3	12.5	6	1.1	0.1	80.3	92.5	98.7
Vestal Company 4	Vestal (T)	Fire	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Vestal Volunteer ES	Vestal (T)	Ambulance	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Harpur's Ferry SVAS	Vestal (T)	Ambulance	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Binghamton Univ Police Station/Admin Bldg	Vestal (T)	EOC	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Vestal Company 4	Vestal (T)	EOC	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
AFRICAN ROAD ES	Vestal (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
CLAYTON AVE ES	Vestal (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
GLENWOOD ES	Vestal (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
VESTAL HILLS ES	Vestal (T)	School	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage					Percent Functionality			
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
VESTAL MS	Vestal (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
VESTAL SHS	Vestal (T)	School	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
American Legion Post 89	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
BU Post Office	Vestal (T)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
BU Student Union Lobby	Vestal (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Calvary Methodist Church	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Drovers Inn	Vestal (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Evangelical Free Church	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Grace Lutheran Church	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Jewish Community Center	Vestal (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Mormon Church of Latter Day Saints	Vestal (T)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Rounds House	Vestal (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Seventh-Day Adventist Church	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Center Methodist Church	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Central High School	Vestal (T)	Historic	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Post Office	Vestal (T)	Post Office	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Public Library	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Public Library	Vestal (T)	Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Vestal Town Hall	Vestal (T)	Municipal Hall	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
DOT Facility	Vestal (T)	DOT	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Ross Corners Christian Academy	Vestal (T)	Shelter	80.3	12.5	6	1.1	0.1	80.3	92.7	98.7
Vestal United Methodist Church	Vestal (T)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Memorial Park Baptist Church	Vestal (T)	Shelter/Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
John Handle American Legion Post 89	Vestal (T)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Calvary Baptist Tabernacle Church	Vestal (T)	Shelter	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
Valleyview Alliance Church	Vestal (T)	Shelter/Poll	80.1	12.6	6.1	1.1	0.1	80.1	92.6	98.7
NYS Police Whitney Point Barricks	Whitney Point (V)	Police	80.1	12.6	6.1	1.1	0.1	80.1	92.4	98.7
Whitney Point	Whitney Point (V)	Fire	79.9	12.7	6.1	1.1	0.1	79.8	92.2	98.7
Grace Episcopal Church	Whitney Point (V)	Historic	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Mary Wilcox Memorial Library	Whitney Point (V)	Library	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Triangle Town Hall	Whitney Point (V)	Poll	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Whitney Point Post Office	Whitney Point (V)	Post Office	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Type	Percent Probability of Sustaining Damage				Percent Functionality				
		None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Whitney Point Village Hall	Whitney Point (V)	Municipal Hall	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Whitney Point United Methodist Church	Whitney Point (V)	Shelter	79.9	12.7	6.1	1.1	0.1	79.8	92.5	98.7
Sheriff Windsor substation	Windsor (T)	Police	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
West Windsor	Windsor (T)	Fire	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
Windsor Station 2	Windsor (T)	Fire	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
West Windsor Ambulance	Windsor (T)	Ambulance	79.7	12.8	6.2	1.2	0.1	79.6	92.1	98.6
WINDSOR CENTRAL HS	Windsor (T)	School	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
West Windsor Baptist Church	Windsor (T)	Poll	79.7	12.8	6.2	1.2	0.1	79.6	92.4	98.6
DOT Facility	Windsor (T)	DOT	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor Station 1	Windsor (V)	Fire	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
Windsor Ambulance	Windsor (V)	Ambulance	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
A.F. PALMER ES / WINDSOR CENTR	Windsor (V)	School	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
WINDSOR CENTRAL MS	Windsor (V)	School	79.2	13	6.4	1.2	0.1	79.2	91.9	98.6
Jedediah Hotchkiss House	Windsor (V)	Historic	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor Community House	Windsor (V)	Poll	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor Post Office	Windsor (V)	Post Office	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor Town Hall	Windsor (V)	Municipal Hall	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor Village Hall	Windsor (V)	Municipal Hall	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Windsor United Methodist Church	Windsor (V)	Shelter	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6
Alice Freeman Palmer Elem School	Windsor (V)	Shelter	79.2	13	6.4	1.2	0.1	79.2	92.2	98.6

Source: HAZUS-MH 2.1



Impact on Economy

Earthquakes also have impacts on the economy, including: loss of business function, damage to inventory, relocation costs, wage loss and rental loss due to the repair/replacement of buildings. A Level 2 HAZUS-MH analysis estimates the total economic loss associated with each earthquake scenario, which includes building- and lifeline-related losses (transportation and utility losses) based on the available inventory (facility [or GIS point] data only). Direct building losses are the estimated costs to repair or replace the damage caused to the building. This is reported in the “Impact on General Building Stock” section discussed earlier. Lifeline-related losses include the direct repair cost to transportation and utility systems and are reported in terms of the probability of reaching or exceeding a specified level of damage when subjected to a given level of ground motion. Additionally, economic loss includes business interruption losses associated with the inability to operate a business due to the damage sustained during the earthquake as well as temporary living expenses for those displaced. These losses are discussed below.

It is significant to note that for the 500-year event, HAZUS-MH 2.1 estimates the County will incur approximately \$6.62 million in income losses (wage, rental, relocation and capital-related losses) which is nearly half the combined 500 –year event structural and non-structural building stock losses (\$13.4 million). For the 2,500-year event, HAZUS-MH 2.1 estimates the County will incur \$57.9 million in income losses, mainly to the residential and commercial occupancy classes associated with wage, rental, relocation and capital-related losses.

Damage results are not considered to be significant as a result of the 100-year and 500-year events. For the 500-year event, there is a 98-percent probability that utilities will not experience any damage; and only a one-percent probability ‘slight’ damage could be experienced. Therefore, utility loss estimates as a result of the 100- and 500-year events are not discussed further in this assessment for this HMP.

Table 5.4.5-17 summarizes the HAZUS-MH 2.1 estimated probability of damage that each utility may sustain (as defined by the column heading) and estimated loss of use in days a result of a 2,500-year MRP earthquake event. Damage categories are related to the damage ratio (defined as ratio of repair to replacement cost) for evaluation of direct economic loss. Refer to the HAZUS-MH Earthquake Technical Manual for a description of the damage categories for each utility feature.

The HAZUS-MH analysis conducted did not compute any damage estimates for roadway segments and railroad tracks. However, it is assumed these features may experience damage due to ground failure and regional transportation and distribution of these materials will be interrupted as a result of an earthquake event. Losses to the community that result from damages to lifelines can be much greater than the cost of repair (HAZUS-MH 2.1 Earthquake User Manual, 2012).

For the 100-, 500- and 2,500-year MRP events, HAZUS-MH 2.1 estimates all highways in Broome County will be fully functional day one of the event. For the 100-year and 500- year MRP events, HAZUS-MH 2.1 estimates highway and railway bridges and airports will be nearly 100% functional day one of the event.

For the 2,500-year MRP event, HAZUS-MH 2.1 estimates highway bridges about 25% of the bridges will not be 100-percent functional day one of the event. The most vulnerable bridges appear to be on NEHRP soil class E and are identified in the HAZUS-MH 2.1 default highway bridge inventory. It is estimated that the airports in Broome County will be 98% functional on day one of the 2,500-year event and an estimated 11- to 12-percent probability they will experience slight damage.

SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Table 5.4.5-17. Estimated Utility Impacts in Broome County from the 2,500-year MRP Earthquake Event

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
WELL #1	Barker (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Pease Hill Tower	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Barker (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
OLMSTEAD WELL	Binghamton (C)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
SUSQUEHANNA RIVER INTAKE	Binghamton (C)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Building with tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Ely Park Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
State Office Building Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Building	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Building with tower	Binghamton (C)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Binghamton (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #2	Binghamton (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Parkwood Sewer District WWTP	Binghamton (T)	WWTF	89.0	7.5	3.3	0.1	0.0	91.8	99.5	99.8	99.9
WBGH-CA CH 8	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WBGH-CA CH 20	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WBNG-TV CH 12	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WVT CH 34	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WICZ-TV CH 40	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WSKG-TV CH 46	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WKOP 1360	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WNBF 1290	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WYOS CH 281	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WAAL CH 256	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
VMXW CH 277	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WLTB CH 269	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WHWK CH 251	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WHWK CH 251	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WSKG-FM CH 207	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
3 Antenna Tower Array	Binghamton (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
CHURCH WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
SCHOOL WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
APPLEWOOD WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
CHENANGO HEIGHTS WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
MAPLEWOOD WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
NORTHGATE WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
PENNVIEW WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
ROUTE 12A WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
RUNACRE WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
BUILDING #1 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #2, WELL #2A	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #3 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #4 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #5 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #1 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
BUILDING #2 WELL	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
LOWER LOTS WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
UPPER LOTS WELL	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #1	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #2 (WELL OUTSIDE HOUSE)	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #3 (NEW WELL)	Chenango (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Chenango (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Pennview Sewer District 10 WWTP	Chenango (T)	WWTF	89.0	7.5	3.3	0.1	0.0	91.8	99.5	99.8	99.9
Northgate WWTP	Chenango (T)	WWTF	89.0	7.5	3.3	0.1	0.0	91.8	99.5	99.8	99.9
Tower	Chenango (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Chenango (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Chenango (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Chenango (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #2	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	87.9	8.2	3.8	0.2	0.0	93.9	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
CREEK SITE WELL	Colesville (T)	Potable Well	88.3	8.0	3.6	0.1	0.0	94.1	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	87.9	8.2	3.8	0.2	0.0	93.9	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	87.9	8.2	3.8	0.2	0.0	93.9	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	87.9	8.2	3.8	0.2	0.0	93.9	99.8	99.8	99.9
WELL #2	Colesville (T)	Potable Well	87.9	8.2	3.8	0.2	0.0	93.9	99.8	99.8	99.9
LOT #73 WELL (WELL #6)	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #1	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
WELL #2	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #3	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #4	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #5	Colesville (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
CL	Colesville (T)	Communication	87.5	8.4	3.9	0.2	0.0	97.8	99.8	99.9	99.9
Tower	Colesville (T)	Communication	88.5	7.8	3.5	0.1	0.0	98	99.8	99.9	99.9
CREEK BRIAR PATCH WELL (#2)	Conklin (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
CREEK ROAD WELL (#3)	Conklin (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #5	Conklin (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #6	Conklin (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #1	Conklin (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL BY LOT #1	Conklin (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL IN MIDDLE OF ROAD	Conklin (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Deposit (V)	Potable Well	86.7	8.8	4.3	0.2	0.0	93.2	99.7	99.8	99.9
WELL #2	Deposit (V)	Potable Well	86.7	8.8	4.3	0.2	0.0	93.2	99.7	99.8	99.9
WELL #4	Deposit (V)	Potable Well	86.7	8.8	4.3	0.2	0.0	93.2	99.7	99.8	99.9
WELL #5	Deposit (V)	Potable Well	86.7	8.8	4.3	0.2	0.0	93.2	99.7	99.8	99.9
Village of Deposit WWTP	Deposit (V)	WWTF	86.3	9.0	4.4	0.2	0.0	89.7	99.3	99.7	99.9
Tower	Dickinson (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #28	Endicott (V)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #32, RANNEY	Endicott (V)	Potable Well	89.4	7.3	3.1	0.1	0.0	94.7	99.8	99.8	99.9
WELL #5	Endicott (V)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
Village of Endicott WWTP	Endicott (V)	WWTF	89.4	7.3	3.1	0.1	0.0	92.1	99.5	99.8	99.9
Round Top Tower	Endicott (V)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
BOTTOM WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
TOP WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
LOT #18 WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
SHOP WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Fenton (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #2	Fenton (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #3	Fenton (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
WELL INSIDE WELL HOUSE	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL ON HILL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL OUTSIDE WELL HOUSE #1	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL OUTSIDE WELL HOUSE #2	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
END OF DRIVEWAY WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
NEWEST WELL IN MIDDLE	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
OLD WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
LEFT OF HILL PUMP PIT WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
LOWER ROAD PUMP HOUSE WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
RIGHT OF HILL PUMP PIT WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
PUMP HOUSE WELL	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL IN WOODS	Fenton (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
Porter Hollow Road Sewer Dist WWTP	Fenton (T)	WWTF	88.6	7.7	3.4	0.1	0.0	91.5	99.5	99.8	99.9
Hawkins Tower	Fenton (T)	Communication	88.6	7.7	3.4	0.1	0.0	98	99.8	99.9	99.9
WELL #6, BURNS STREET	Johnson City (V)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #7, NORTH BROAD ST.	Johnson City (V)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Tower	Johnson City (V)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Johnson City (V)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Kirkwood (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL #1, MIDDLE WELL	Kirkwood (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #2, SOUTH WELL	Kirkwood (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL #3, NORTH WELL	Kirkwood (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
CORNER WELL	Kirkwood (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WELL NEXT TO PUMP HOUSE	Kirkwood (T)	Potable Well	88.6	7.7	3.4	0.1	0.0	94.3	99.8	99.8	99.9
WINR 680	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Old State Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Kirkwood (T)	Communication	88.6	7.7	3.4	0.1	0.0	98	99.8	99.9	99.9
Tower	Kirkwood (T)	Communication	88.6	7.7	3.4	0.1	0.0	98	99.8	99.9	99.9
Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Kirkwood (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL IN WELL HOUSE	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL ON HILL	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WHITNEY ACRES WELL #2	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WHITNEY ACRES WELL #3	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WHITNEY ACRES WELL #4	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WHITNEY ACRES WELL #5	Lisle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
CL	Lisle (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
CL	Lisle (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #2	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #2	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
BARN SITE WELL	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
CREEK STREET WELL	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
MAIN STREET WELL	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
NORTH WELL	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
SOUTH WELL #2	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
HOUSE WELL	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
SOUTH WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WOODS WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WOODS WELL #2	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #1	Maine (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
Airport Tower	Maine (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Maine (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Maine (T)	Communication	89.4	7.3	3.1	0.1	0.0	98.2	99.9	99.9	99.9
WELL #1 AS MARKED	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
WELL #2 AS MARKED	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
NEW WELL BY ROAD	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
OLD WELL	Nanticoke (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL BEHIND PUMP HOUSE	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL CLOSEST TO PUMP HOUSE	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
PUMP HOUSE #2, WELL #1	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
PUMP HOUSE #2, WELL #2	Nanticoke (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
Oquaga Lake WWTP	Sanford (T)	WWTF	86.7	8.8	4.3	0.2	0.0	90	99.3	99.7	99.9
WYN CH 234	Sanford (T)	Communication	86.7	8.8	4.3	0.2	0.0	97.6	99.8	99.9	99.9
Tower	Sanford (T)	Communication	86.7	8.8	4.3	0.2	0.0	97.6	99.8	99.9	99.9
CL	Sanford (T)	Communication	87.5	8.4	3.9	0.2	0.0	97.8	99.8	99.9	99.9
NORTH WELL	Triangle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
PUMP HOUSE WELL	Triangle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
PUMP HOUSE #2, WELL #1	Triangle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
PUMP HOUSE #2, WELL #2	Triangle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
PUMP HOUSE #2, WELL #3	Triangle (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
Tower	Triangle (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
WELL #1	Union (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #2, SOUTH OF PLANT	Union (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #3, NORTH OF PLANT	Union (T)	Potable Well	89.2	7.4	3.2	0.1	0.0	94.6	99.8	99.8	99.9
WELL #5, FIFTH STREET	Union (T)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WMRV-FM CH 289	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
WBBI CH 298	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Union Tower	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
CL	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Union (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Bing/J City Sewage Board WWTP	Vestal (T)	WWTF	89.0	7.5	3.3	0.1	0.0	91.8	99.5	99.8	99.9
WENE 1430	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
WHRW CH 213	Vestal (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Binghamton Univ (Library Tower)	Vestal (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage				Percent Functionality				
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Binghamton Univ (Admin Tower)	Vestal (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
5 Antenna Tower Array	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
5 Antenna Tower Array	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
5 Antenna Tower Array	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
5 Antenna Tower Array	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
5 Antenna Tower Array	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Building	Vestal (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
CL	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.0	7.5	3.3	0.1	0.0	98.1	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
Tower	Vestal (T)	Communication	89.2	7.4	3.2	0.1	0.0	98.2	99.8	99.9	99.9
WELL PW-1	Whitney Point (V)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL PW-2	Whitney Point (V)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
WELL PW-3	Whitney Point (V)	Potable Well	89.0	7.5	3.3	0.1	0.0	94.5	99.8	99.8	99.9
OLD LAUNDRY WELL	Windsor (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
UPPER WELL #1	Windsor (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
UPPER WELL #2	Windsor (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #1	Windsor (T)	Potable Well	88.3	8.0	3.6	0.1	0.0	94.1	99.8	99.8	99.9
WELL #1	Windsor (T)	Potable Well	88.5	7.8	3.5	0.1	0.0	94.2	99.8	99.8	99.9
WELL #1	Windsor (T)	Potable Well	88.3	8.0	3.6	0.1	0.0	94.1	99.8	99.8	99.9
PUMP HOUSE WELL	Windsor (T)	Potable Well	87.7	8.3	3.8	0.2	0.0	93.8	99.8	99.8	99.9
WELL ON HILL	Windsor (T)	Potable Well	87.7	8.3	3.8	0.2	0.0	93.8	99.8	99.8	99.9
Pine Valley Sewer District 1 WWTP	Windsor (T)	WWTF	88.6	7.7	3.4	0.1	0.0	91.5	99.5	99.8	99.9
Pine Valley Sewer District 2 WWTP	Windsor (T)	WWTF	88.6	7.7	3.4	0.1	0.0	91.5	99.5	99.8	99.9
WIFF CH 211	Windsor (T)	Communication	88.5	7.8	3.5	0.1	0.0	98	99.8	99.9	99.9
WCDW CH 263	Windsor (T)	Communication	88.5	7.8	3.5	0.1	0.0	98	99.8	99.9	99.9
WKGB-FM CH 223	Windsor (T)	Communication	88.5	7.8	3.5	0.1	0.0	98	99.8	99.9	99.9
Tuscarora Tower	Windsor (T)	Communication	87.5	8.4	3.9	0.2	0.0	97.8	99.8	99.9	99.9
Tower	Windsor (T)	Communication	87.9	8.2	3.8	0.2	0.0	97.9	99.8	99.9	99.9
CL	Windsor (T)	Communication	87.9	8.2	3.8	0.2	0.0	97.9	99.8	99.9	99.9



SECTION 5.4.5: RISK ASSESSMENT – EARTHQUAKE

Name	Municipality	Type	Percent Probability of Sustaining Damage					Percent Functionality			
			None	Slight	Moderate	Extensive	Complete	Day 1	Day 7	Day 30	Day 90
Tower	Windsor (T)	Communication	87.7	8.3	3.8	0.2	0.0	97.8	99.8	99.9	99.9
WELL #1, BEHIND GARAGE	Windsor (V)	Potable Well	88.3	8.0	3.6	0.1	0.0	94.1	99.8	99.8	99.9
WELL #2, ACROSS CREEK	Windsor (V)	Potable Well	88.3	8.0	3.6	0.1	0.0	94.1	99.8	99.8	99.9

Source: HAZUS-MH 2.1



HAZUS-MH 2.1 also estimates the volume of debris that may be generated as a result of an earthquake event to enable the study region to prepare and rapidly and efficiently manage debris removal and disposal. Debris estimates are divided into two categories: (1) reinforced concrete and steel that require special equipment to break it up before it can be transported, and (2) brick, wood and other debris that can be loaded directly onto trucks with bulldozers (HAZUS-MH Earthquake User’s Manual).

For the 100-year MRP event, HAZUS-MH 2.1 estimates 100 tons of debris will be generated. For the 500-year MRP event, HAZUS-MH 2.1 estimates approximately 11,091 tons of debris will be generated. For the 2,500-year MRP event, HAZUS-MH 2.1 estimates greater than 80,000 tons of debris will be generated.

Table 5.4.5-18. Estimated Debris Generated by the 500- and 2,500-year MRP Earthquake Events

Municipality	500-Year		2,500-Year	
	Brick/Wood (tons)	Concrete/Steel (tons)	Brick/Wood (tons)	Concrete/Steel (tons)
Barker (T)	44	11	291	110
Binghamton (C)	2,833	1,190	15,958	13,922
Binghamton (T)	92	22	624	223
Chenango (T)	218	52	1,421	511
Colesville (T)	119	32	770	308
Conklin (T)	136	39	896	391
Dickinson (T) and Port Dickinson (V)	109	30	702	290
Endicott (V)	624	222	3,423	2,284
Fenton (T)	329	76	2,156	749
Johnson City (V)	742	265	4,237	2,792
Kirkwood (T)	172	52	1,123	527
Lisle (T) and (V)	408	190	2,446	2,630
Maine (T)	134	35	885	351
Nanticoke (T)	42	12	264	111
Sanford (T) and Deposit (V)	72	20	544	214
Triangle (T) and Whitney Point (V)	127	40	829	405
Union (T)	1,332	473	7,491	5,349
Vestal (T)	494	122	3,280	1,216
Windsor (T) and (V)	142	37	966	380
Broome County	8,170	2,920	48,307	32,763

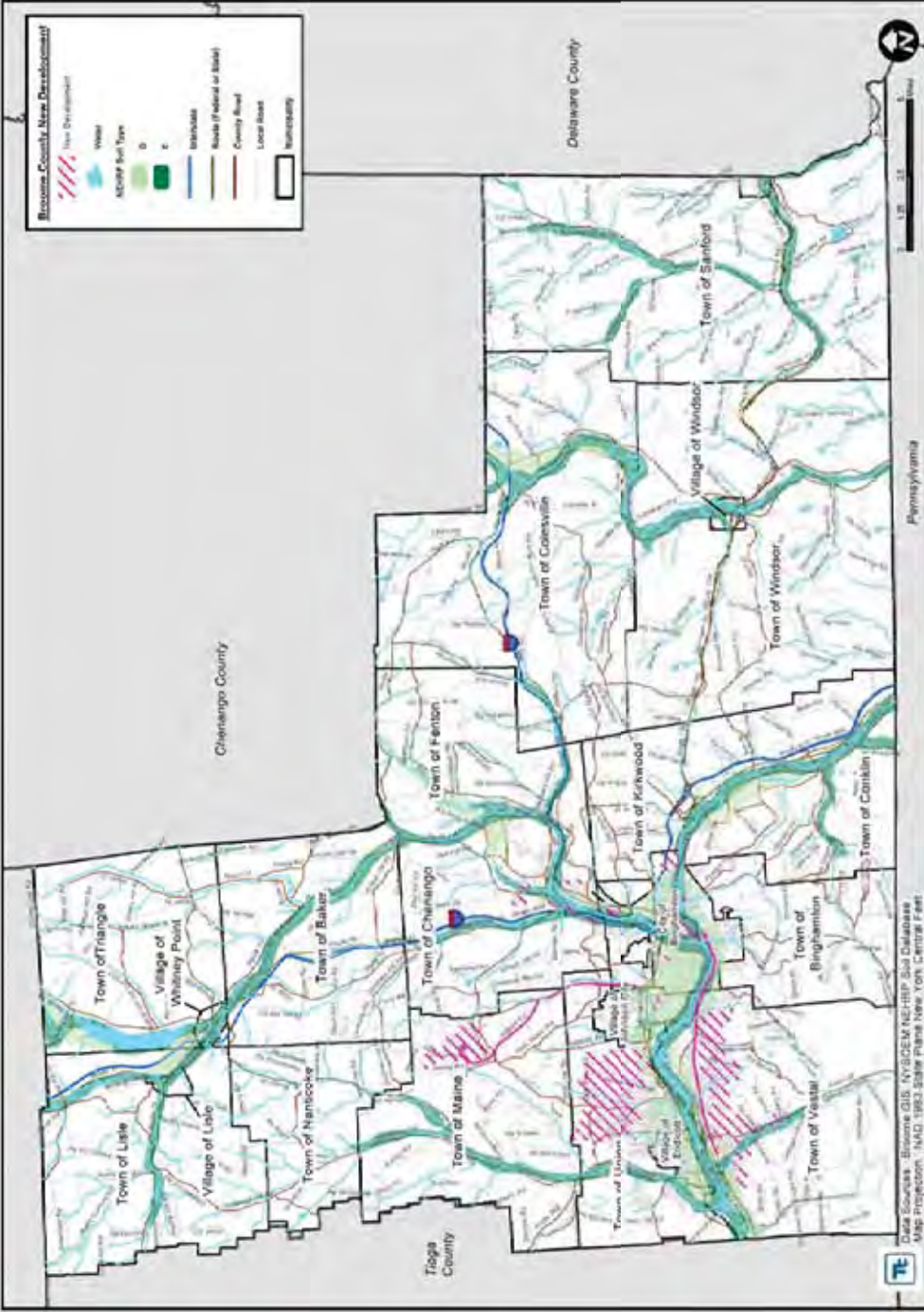
Source: HAZUS-MH 2.1

Future Growth and Development

As discussed in Section 4, areas targeted for future growth and development have been identified across the County. It is anticipated that the human exposure and vulnerability to earthquake impacts in newly developed areas will be similar to those that currently exist within the County. Current building codes require seismic provisions that should render new construction less vulnerable to seismic impacts than older, existing construction that may have been built to lower construction standards.

New development located in areas with softer NEHRP soil classes may be more vulnerable to the earthquake hazard. Refer to Figure 5.4.5-14 for potential new development and NEHRP soil in Broome County. Some potential new development is located with NEHRP soil classes D and E.

Figure 5.4.5-14. Potential New Development in Broome County and NEHRP Soil Types



Source: Broome GIS; NYSOEM; NEHRP Soil Database

Broome GIS; NYSOEM NEHRP Soil Database



Change of Vulnerability

The earthquake hazard was not evaluated as part of the 2007 original HMP. As summarized in Section 5.2 (Hazards of Concern) the NYS HMP identifies earthquake as a hazard of concern for New York State. According to the USGS online seismic hazard maps, the peak ground acceleration with a 10% probability of exceedance over 50 years for Broome County is between 2 and 3% g. FEMA guidance recommends earthquakes are evaluated further if an area has a 3% g peak acceleration or more. Broome County decided to evaluate the earthquake hazard as part of their HMP update.

Effect of Climate Change on Vulnerability

The impacts of global climate change on earthquake probability are unknown. Some scientists say that melting glaciers could induce tectonic activity. As ice melts and water runs off, tremendous amounts of weight are shifted on the earth's crust. As newly freed crust returns to its original, pre-glacier shape, it could cause seismic plates to slip and stimulate volcanic activity according to research into prehistoric earthquakes and volcanic activity. NASA and USGS scientists found that retreating glaciers in southern Alaska may be opening the way for future earthquakes (NASA, 2004).

Secondary impacts of earthquakes could be magnified by climate change. Increased saturation of soils by more frequent and/or intense storms could increase the risk for liquefaction. Dams storing increased volumes of water due to changes in the hydrograph could fail during seismic events. There are currently no models available to estimate these impacts.

Additional Data and Next Steps

A Level 2 HAZUS-MH earthquake analysis was conducted for Broome County using the default model data, with the exception of the updated building and critical facility inventories which included user-defined data, and NEHRP soil data. Additional data needed to further refine the County's vulnerability assessment include: (1) updated demographic data to update the default data in HAZUS-MH; and (2) soil liquefaction data. Additionally, the County can identify un-reinforced masonry critical facilities and privately-owned buildings (i.e., residences) using local knowledge and/or pictometry/orthophotos. These buildings may not withstand earthquakes of certain magnitudes and plans to provide emergency response/recovery efforts for these properties can be set in place. Further mitigation actions include training of County and municipal personnel to provide post-hazard event rapid visual damage assessments, increase of County and local debris management and logistic capabilities, and revised regulations to prevent additional construction of non-reinforced masonry buildings.