



## 5.4.11 Transportation Accident

The following section provides the hazard profile (hazard description, location, extent, previous occurrences and losses, probability of future events, and impact of climate change) and vulnerability assessment for the transportation accident hazard in Genesee County.

### 5.4.11.1 Hazard Profile

#### Description

Transportation accidents include the following: vehicular, aviation, hazardous materials in transit, at-grade railroad crossings, and roadways vulnerable to floods. In 2013 (the most recent data available), the National Transportation Safety Board (NTSB) reported 34,678 transportation-related fatalities. Of those 34,678 fatalities, 32,719 were highway incidents, 819 were rail incidents, 443 were aviation incidents, 10 were pipeline incidents, and 615 were marine incidents (NTSB 2013). For the purpose of this plan update, transportation accidents are defined as incidents involving highway, air, and rail travel, including hazardous materials in transport, resulting in death, serious injury, extensive property loss or damage; or situations that cause delay or closure.

A transportation hazard may be defined as a condition created by movement of anything by common carrier. Transportation hazards can be divided into two categories: hazards created by the material being transported, and hazards created by the transportation medium. Transportation systems available in Genesee County include roadways, railways, and airports. Based on historical records, major road accidents in the county are probable; however, aviation or rail accidents are unlikely. All county systems and supporting transportation resources provide services locally, regionally, and nationally. Transportation accidents involving road, air, and rail travel are defined below:

- **Vehicular Accidents:** A vehicular accident is a road traffic incident that usually involves one vehicle colliding with another vehicle or other road user, such as an animal or a stationary roadside object. A vehicular accident may result in injury, property damage, or possible fatalities. Many factors contribute to vehicular accidents, including equipment failure, poor road conditions, weather, traffic volume, and driver behavior.
- **Aviation Accidents:** According to the International Civil Aviation Organization, an aviation accident is an occurrence during operation of an aircraft between the time a person boards the aircraft with intent to fly to a destination, to the time the person has disembarked the aircraft. Three different situations qualify as an aviation accident: a person is fatally or seriously injured; the aircraft sustains damage or structural failure; or the aircraft is missing or inaccessible. An aviation incident is an occurrence, other than an accident, associated with operation of an aircraft that affects or could affect the safety of operation (International Civil Aviation Organization 2015). Although Genesee County is home to only one major airport, the Genesee County Airport, and a few private airports/airstrips thereby limiting the probability of aviation accidents, airport accidents and incidents have the potential to occur while a plane is flying over county airspace.
- **Hazardous Materials (HazMat) in Transit:** A HazMat is defined as a substance or material determined capable of posing an unreasonable risk to health, safety, or property when transported. “Unreasonable risk” covers a broad range of health, fire, and environmental considerations. HazMat substances come in various forms, which, under certain conditions, can cause death; serious injury; long-lasting health effects; and damage to buildings, homes, and other property. HazMat substances include explosives, flammable solids, substances that become dangerous when wet, oxidizing substances, and toxic liquids. An accident involving a vehicle carrying HazMats becomes a HazMat incident if the HazMat leaks; is involved in a fire; or if potential for release, fire, or other



hazard exists. Hazards can occur during production, storage, transportation, use, or disposal of HazMats (Illinois Emergency Management Agency 2012; Federal Emergency Management Agency [FEMA] 2015).

- **Railway Accidents:** Railway accidents involve one or more trains. They can involve a train derailment or one train impacting another train, vehicle, or pedestrian.

Transportation of HazMats is a threat to Genesee County. Volatility of products transported, along with potential impact on a local community, may increase risk of intentional acts against a transport vehicle. Release of certain products, considered as HazMats, can cause immediate and adverse impacts on the general population, ranging from the inconvenience of evacuations to personal injury and even death. Additional effects of a release of HazMats from transportation accidents are addressed in the Hazardous Materials profile (Section 5.4.7).

This section describes the location and extent, range of magnitude, past occurrence, probability of future event, and vulnerability assessment for the transportation accident hazard for the Genesee County Hazard Mitigation Plan (HMP) Update.

### **Extent**

Roadway accidents in Genesee County range from minor crashes to more serious incidents that involve injuries or fatalities, or result in a release of HazMats (described further in Section 5.4.7).

Rail accidents can vary widely in terms of injuries, fatalities, property damage, and interruption of service, depending on the nature and severity of the accident. A major chemical spill occurred in Le Roy as a result of a train derailment in December 1970. Approximately 30,000 gallons of trichloroethylene (TCE), a toxic solvent, was released into the soil and groundwater. The spill spread and also impacted nearby drinking-water wells in Monroe and Livingston Counties (Orr 2015).

Aircraft accidents can vary from a single-engine aircraft having a “hard landing” causing damage to the aircraft, to a crash of a small turboprop or jet aircraft, to a crash of a large jet aircraft (such as a Boeing 727). Other aircraft accidents could include helicopter or experimental aircraft crashes. Aviation accidents also can involve radio-controlled or drone aircraft devices, many of which are experimental and not subject to defined regulatory oversight, potentially complicating issues with and for the public that could arise if one of these devices crashes.

The worst-case transportation accident within the county would be overturn of a tractor trailer carrying an extremely hazardous substance (described in Section 5.4.7) resulting in a massive release of its cargo on a major roadway. This incident would block traffic on Genesee County’s major transportation routes, and could threaten the health and safety of individuals on the roadways and in surrounding neighborhoods. In addition, a release could necessitate closure of critical facilities. The most likely transportation accident in the county would involve a single vehicle hitting an object and sustaining minimal damage.

### **Location**

#### **Vehicular Accidents**

Genesee County is bisected by the New York State Thruway (I-90) which is the primary east/west transportation route in New York State. The Thruway runs through the towns of Pembroke, Batavia, Stafford, and LeRoy.



Three I-90 exits serve Genesee County: Exit 47 (LeRoy), Exit 48 (Batavia), and Exit 48A (Pembroke). Route 490 is another primary transportation route, and connects the county to the Greater Rochester area.

A total of 1,129 miles of roads are present in Genesee County. Table 5.4.11-1 provides a breakdown of the roads and Figure 5.4.11-1, on the following page, indicates the major routes. Major roadways in Genesee County include I-90 and Route 490. Transportation accidents can occur at any point along these roadways, with many occurring at the intersection of two or more roadways.

**Table 5.4.11-1. Genesee County Transportation Network**

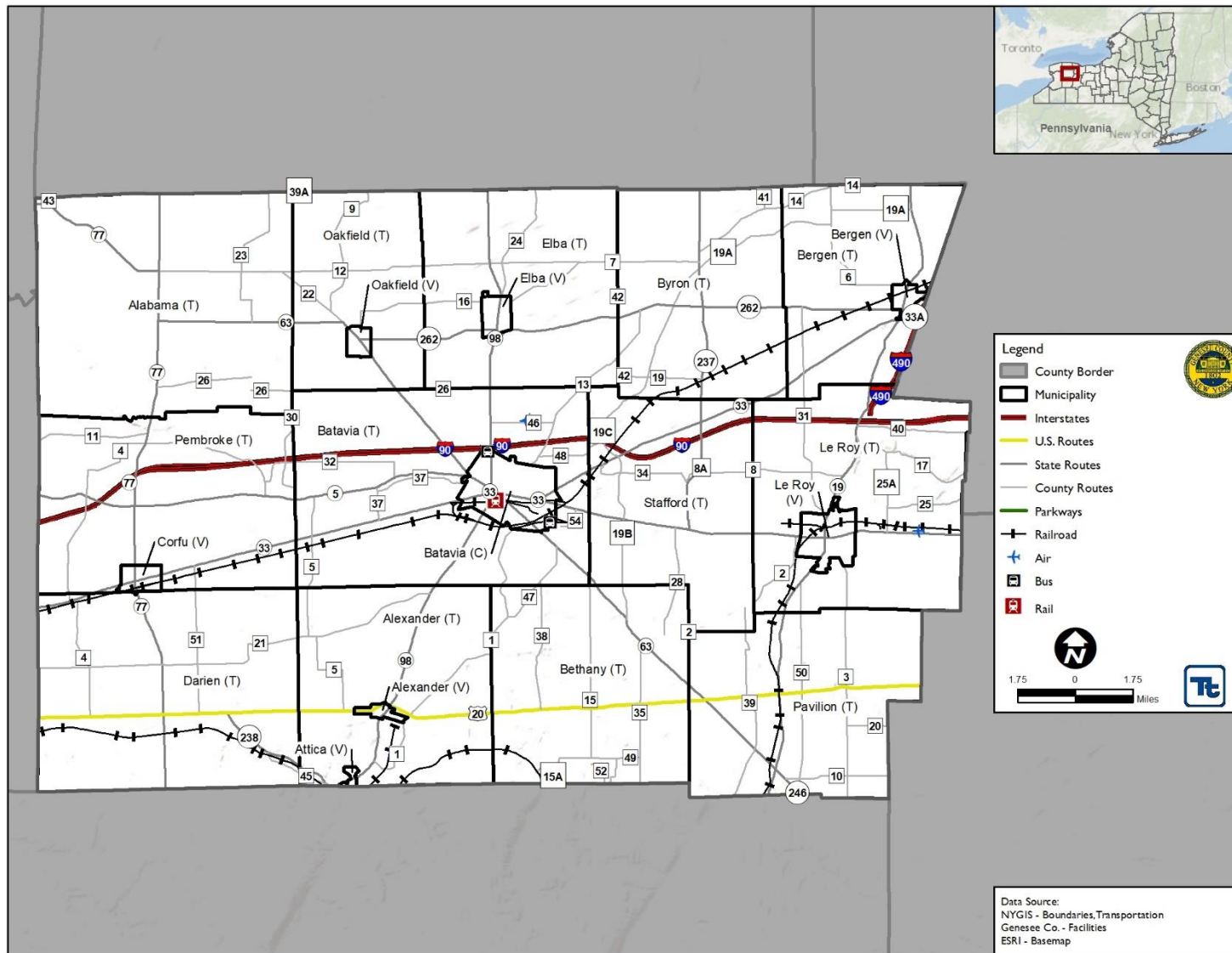
Category	Miles
Interstate Highway	64
Freeways/Expressways	27
Principal Arterials	176
Minor Arterials	0
Major Collectors	257
Minor Collectors	0
Local Roads	605
<b>Total</b>	<b>1,129</b>

Source: NYSDOT 2016

There is no warning time for vehicular accidents. Factors contributing to these accidents are typically associated with the driver, vehicle, and the environment. Factors associated with the driver include error, speeding, lack of experience, texting or talking on a cellular phone, and blood-alcohol level. Factors associated with the vehicle include type, condition, and center of gravity. Environmental factors include quality of the infrastructure, weather, and obstacles. The majority of vehicular accidents are attributed to the driver. Vehicular accidents can severely affect those directly involved, as well as others not directly involved. Other effects may include severe traffic delays, lost sales to businesses, delayed commodity shipments, and increased insurance costs (Cova and Conger 2004).



Figure 5.4.11-1. Major Transportation Routes in Genesee County



Source: Genesee County 2017





Railway Accidents

CSX, Norfolk Southern, and two short lines (Depew, Lancaster & Western Railroad, and Rochester & Southern Railroad) provide railroad service throughout the county. County rail lines are shown in Figure 5.4.11-1.

Aviation Accidents

The Genesee County Airport is the main air facility; however, a few private air strips are also located throughout the county. Two major regional airports, the Greater Rochester International Airport and the Buffalo Niagara International Airport, are located near the county. These airports may have associated air traffic patterns in the skies above Genesee County that could lead to problems in flight resulting in a crash within the county boundaries.

Approximately 80 percent of all aviation accidents occur shortly before or during take-off and landing. Reportedly, most of these accidents are caused by human error. Mid-flight accidents are rare but not unheard of. A survey of 1,843 plane crashes between 1950 and 2006 showed that 53 percent were the result of pilot (human) error, 21 percent were caused by mechanical failure, 11 percent were caused by weather, 8 percent were attributed to other human error (lack of communication or improper maintenance), 6 percent were caused by sabotage and terrorism, and 1 percent resulted from other causes (Krasner 2009).

Aviation accidents are often devastating incidents that may result in serious injuries or fatalities. The Federal Aviation Administration (FAA) and NTSB are the agencies responsible for monitoring air travel and investigating accidents. Some of the most common causes of aviation accidents occur as a result of violations of FAA and NTSB regulations. Some other causes of accidents include, but are not limited to:

- Pilot or flight crew errors – Pilot error is the primary cause of aviation accidents and accounts for the highest number of fatalities. Pilots have the responsibility to transport passengers safely from one place to another and follow the FAA and NTSB regulations to better ensure passenger safety. If a pilot or flight crew makes an error, an accident may occur.
- Faulty equipment – Faulty aircraft equipment or mechanical features is another common cause of aviation accidents.
- Aircraft design flaws – The manufacturer of an aircraft is responsible for an aviation accident if the structural design is flawed and results in an accident.
- Failure to properly fuel or maintain the aircraft – If any regulations and safety standards set by the FAA or NTSB are violated, an accident may occur.
- Negligence of Federal Air Traffic Controllers – Failure of air traffic controllers to properly monitor the airways is another cause of aviation accidents (*Aviation Law News* n.d.).

Previous Occurrences and Losses

Major roadway accidents (such as multi-vehicle accidents, those that close roads or bridges, or those involving school buses) are reported to the state. Table 5.4.11-2 summarizes these accidents from 2009 to 2016. While this table lists accidents reported to the county and state agencies, significantly more minor accidents are not reported.

Table 5.4.11-2. Summary of Major Transportation Accidents in Genesee County, 2009 to 2016

Year	Vehicle Accidents	Fatal	Personal Injury	Property Damage	Railroad Incidents	Aircraft Accidents
2009	2,069	9	482	\$1,578	1	1
2010	2,126	8	511	\$1,607	0	0
2011	1,860	8	402	\$1,450	0	1





Year	Vehicle Accidents	Fatal	Personal Injury	Property Damage	Railroad Incidents	Aircraft Accidents
2012	2,010	11	446	\$1,553	0	1
2013	2,070	8	421	\$1,641	0	0
2014	2,005	5	368	\$1,632	0	1
2015	1,910	6	384	\$1,520	0	1
2016	1,922	5	378	\$1,539	0	1

Source: New York State Department of Motor Vehicles (NYS DMV) 2017; NTSB 2018; Federal Railroad Administration 2017

### Probability of Future Events

Transportation hazards are impossible to predict accurately; however, areas prone to these hazards can be located, quantified through analysis of historical records, and plotted on county-wide and municipality base maps. Certain characteristics that together cause these hazards or increase vulnerability to these hazards can be identified, and areas that may be prone are identifiable.

For this 2019 HMP update, the most up-to-date data was collected to calculate the probability of future occurrence of transportation events, of all magnitudes, for Genesee County. Information from NYS DMV, NTSB, and the Federal Railroad Administration were used to identify the number of transportation accidents and incidents that occurred between 2009 and 2016. Using these sources ensures the most accurate probability estimates possible. The tables below show these statistics, as well as the annual average number of events and the estimated percent chance of an incident occurring in any given year.

**Table 5.4.11-3. Probability of Future Occurrences of Transportation Accidents and Incidents**

Hazard Type	Number of Occurrences Between 2009 and 2016	Rate of Occurrence or Annual Number of Events (average)	Recurrence Interval (in years) (# Years/Number of Events)	Probability of Event in any given year	Percent chance of occurrence in any given year
Vehicle Accidents	15,972	2,281.71	0.001	1,996.50	100%
Railroad Incidents / Accidents	1	0.14	8.00	0.13	12.5%
Aircraft Incidents/ Accidents	6	2.00	0.67	1.50	100%
<b>Total</b>	<b>15,979</b>	<b>2,282.71</b>	<b>0.001</b>	<b>1,997.38</b>	<b>100%</b>

Source: NYS DMV 2017; NTSB 2018; Federal Railroad Administration 2017

It is estimated that Genesee County will continue to experience transportation accidents and incidents each year, with a majority of the incidents occurring as vehicle accidents.

In Section 5.3, the identified hazards of concern for Genesee County were ranked. The probability of occurrence, or likelihood of the event, is one parameter used for hazard rankings. Based on historical records and input from the Planning Committee, the probability of occurrence for transportation accidents in the county is considered “frequent” (likely to occur within 25 years, as presented in Table 5.3-1).

### Climate Change Impacts

Road, rail, and air traffic is vulnerable to freezing rain (icing) and snow. Increasing temperatures lead to shorter-duration freezes of Lake Ontario and the Finger Lakes, allowing more moisture to be drawn up. During the winter months, that moisture may fall as snow or freezing rain across central New York State. Additional snow and icing would result in more transportation accidents (NYSERDA 2011).



### 5.4.11.2 Vulnerability Assessment

To understand risk, a community must evaluate the assets that are exposed or vulnerable within the identified hazard area. For the transportation accident hazard, all of Genesee County has been identified as the hazard area. Therefore, all assets in the county (population, structures, critical facilities, and lifelines), as described in the County Profile (Section 4 of this HMP), are vulnerable to a transportation accident. This section discusses the potential impact of the transportation accident hazard on the county. Specifically, this section addresses:

- Overview of vulnerability
- Data and methodology used for the evaluation
- Impacts to (1) life, health, and safety of residents; (2) general building stock; (3) critical facilities; (4) economy; and (5) future growth and development
- Change of vulnerability as compared to that presented in the 2008 Genesee County Hazard Mitigation Plan
- Further data collections that will increase understanding of this hazard over time.

#### Overview of Vulnerability

County transportation systems rely on use of roadways. Hazards associated with transportation can be natural hazards that affect the roadway, the material being transported, or hazards pertaining to the transportation medium itself. Multiple major roadways (interstates and other major highways) within the county are used by residents and commuters, and these are means for transporting all types of materials, including HazMats. A major accident on any of these major roadways is possible, which could minimally, moderately, or severely affect the county in various ways.

#### Data and Methodology

Data on transportation accidents was obtained from the county, local officials, and federal data sources. In addition, the Planning Partnership has identified roadways within the county that are also vulnerable to other natural hazards (flood).

#### Impact on Life, Health, and Safety

Transportation hazards could lead to potential losses in human health and life, property, and natural resources. Vehicular accidents, flooded roadways, and other roadway impairments may result in injury or death to drivers and passengers on the road, the public in the immediate vicinity, and emergency services personnel. The number of people exposed depends on population density, whether the accident occurs during day or night, and whether the accident location is near a population located indoors and outdoors.

Genesee County and its municipalities are prepared to manage and respond to transportation hazards.

#### Impact on General Building Stock, Critical Facilities, Economy and Future Development

Because of insufficient data, a full loss estimate was not completed for the transportation hazard. Loss of roadway use and public transportation services would affect thousands of commuters, employment, day-to-day operations within the county, and delivery of critical municipal and emergency services. Disruption of one or more of these modes of transportation can lead to congestion of another, and affect both the county and the region as a whole.

As discussed in Section 4, areas targeted for future growth and development have been identified across Genesee County. Future growth could affect the amount of road traffic. Areas targeted for potential future growth and



development within the next 5 years have been identified across the county at the municipal level. Refer to the jurisdictional annexes in Volume II of this HMP.

### **Change in Vulnerability**

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Overall, the county’s vulnerability has not changed since the HMP was developed in 2008, and the entire county will continue to be exposed and vulnerable to the transportation accident hazard.

### **Additional Data and Next Steps**

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Based on limited data regarding the probability and potential impact of this hazard, a quantitative loss estimate was not completed for this HMP. Over time, the county can work with appropriate agencies to collect additional data to support mitigation planning, consideration of potential risks, and prioritization of mitigation measures for this hazard.

Genesee County recognizes it must compile and maintain data regarding specific concerns and past losses from this hazard. These data should include specific information regarding damage or loss of life, property, or infrastructure; and any data pertaining to potential or actual cost and logistics of responding to an event caused by this hazard (locations of road closures, map detours, traffic counts, durations of closures and detours; and costs to respond). These data will be included in future revisions of the HMP, and can be used to support future mitigation grant efforts (benefit cost analysis).

Studying traffic and potential transportation accident patterns could provide information on vulnerability of specific road segments and nearby populations. Increased understanding of the types of HazMats transported through and within the county will also support mitigation efforts. Maintaining a record of these frequently transported materials can facilitate development of preparatory measures to respond to a release. Predicting costs to respond to a release, remediate the environment, or repair damaged infrastructure would be useful for developing mitigation options.