

Northfield

Summary of hazards and concerns, based on feedback from the February 2020 project kick-off meetings and from meetings with the Northfield Select Board, Planning Board, Energy Committee, and Library in the fall of 2020. This summary is intended to be a starting point for discussion, and will be updated as additional public input is received through the workshops and online surveys in winter and spring 2021.

Top Hazards

- Heavy precipitation and flooding
- Severe storms and strong wind
- Dam failure
- Manmade Hazards

Areas of Concern

- **Infrastructure and Facilities:** Impacts to waste water treatment plant; drinking water supply infrastructure; power lines, cell towers, roads, culverts, dams and bridges; Back-up power; Back-up emergency communication infrastructure
- **Community and Population:** Emergency notification, Emergency Action Plans; response and sheltering; power outages; home heating and cooling; insect-borne disease/ infectious disease; impacts to recreational facilities and natural resources with recreational value
- **Environment:** The Connecticut River; farmland; forest health; cold water streams and watershed resiliency; flash flooding; dam inundation areas; water quality; wetlands; invasive species and pests

Current Concerns and Challenges Presented by Hazards and Climate Change

Northfield residents and town officials have described how rain events are notably more extreme, bringing very heavy and fast precipitation that leads to hazardous flash flooding, erosion, inflow and infiltration (I/I) into the sewer system, pressure on culverts, and road damage, particularly on the Town's gravel roads. Heavy rain events can also lead to riverine flooding the Connecticut River, which is a major concern facing the Northfield Water District, the Town's waste water treatment plant located adjacent to the river. In addition to the risk of inundation by rising water levels on the Connecticut River, the plant's actual waste water treatment process becomes overwhelmed with stormwater through I/I, which bypasses the system and causes untreated waste water to flush directly into the river. A new assessment by the State found that the waste water treatment plant is in need of over \$8 million in repairs and upgrades.

Northfield's abundant natural areas and wetlands serve as green infrastructure by slowing, absorbing, and storing flood waters. However, there are some flashy streams that are impacted by heavier precipitation events, especially in east Northfield due to the steep topography on the east side of the Connecticut River watershed. Four Mile Brook Road is still prone to flooding from Four Mile Brook, and Caldwell Road in front of the Highway Garage and transfer station are susceptible to wash outs. The same issue is likely impacting other streams in town. Culverts regularly get clogged and can cause flooding and road washouts. Gulf Road is in poor condition, while Northfield Road in Warwick and Warwick Road in Northfield have many failing culverts.

Another common concern among stakeholders is the increase in the frequency and severity of storms, especially the impact of strong wind on trees, power lines, and communication infrastructure in town. On May 16, 2020, a severe thunderstorm with wind gusts of over 60 miles per hour caused significant tree damage in Northfield and across Franklin County. Another storm on September 30, 2020, caused 23 power outages in Northfield, the most of any town or city in Western Massachusetts besides Hatfield, which had 30.¹ Just one week later, on October 7, high winds brought down all three primary power lines along Route 10, trapping a man in his vehicle with live wires blocking his way in both directions. One of the wires was wedged in his trunk lid, contributing to the life-threatening nature of the situation.² Heavy winds can also damage cell phone and radio tower equipment. Northfield has many large trees along Main Street and central neighborhoods, many of which are aging and in need of assessment. Some town trees are falling during storms, disrupting power and internet. Trees in the public right of way elsewhere require ongoing care and maintenance which has to be coordinated with the utility company. The Town values its large trees for their air quality, temperature regulations, and scenic value, but needs to ensure that hazard trees are addressed in order to safeguard against the impacts of high wind. Undergrounding utilities in priority locations is a preferable but often cost-prohibitive strategy.

Energy resilience is a concern for both private citizens and municipal buildings in Northfield. Backup power at Town Hall and Dickinson Memorial Library needs to be assessed and upgraded for the buildings to continue their vital functions during long-term power outages. There is a generator for backup power at The Senior Center in the basement of Town Hall, but it would be insufficient to run the heating system for the whole building. Other Town buildings, including the Highway Garage, need to be evaluated for backup power, energy efficiency, and indoor health improvements, which should also be tied to energy resilience measures that increase on-site renewable energy generation, electrification, and back-up power capabilities.

¹ <https://www.recorder.com/Following-Wednesday-morning-storm-Northfield-suffered-most-power-outages-36532988>

² <https://www.recorder.com/a1-high-winds-Franklin-County-36689466>

Northfield's emergency sheltering options need to be reassessed for their readiness to provide overnight or daytime-only shelter, heating, cooling, ventilation, social distancing during a pandemic, food and medical supplies, and sanitation. The COVID-19 pandemic has highlighted the need for enhanced communication. Town facilities are also in need of upgrades to improve air circulation and ventilation to help reduce the risk of infectious disease. The largest potential emergency shelter, Pioneer Valley Regional School, is on the west side of the river and would be inaccessible to the majority of Northfield residents if the Route 10 bridge over the Connecticut River were to be rendered impassable. Planned energy and air quality improvements to Northfield Elementary School will make it suitable for use as a shelter, but it may be too small. There is also a need to reassess and update emergency procedures for opening emergency shelters, for participating in a Regional Sheltering Plan, and for opening and operating the EOC at Northfield Town Hall during emergencies.

Northfield's emergency notification system needs to be improved. Not everyone is on the reverse 911 system, CODE RED, and a number of challenges with communications infrastructure, including spotty cell phone and internet service, means residents may lack reliable access to emergency information. The Town utilizes community liaisons between different contexts to ensure key populations are reached, however, communication could be centralized to avoid miscommunication or communication gaps between different town departments, boards, schools, and residents. There is a need to expand CODE RED to target elder adults and to improve contact between TRIAD and the Senior Center on outreach. In some cases, communication needs to be reestablished with new owners of neighboring institutions and critical facilities to foster mutual emergency preparedness, including Thomas Aquinas College, The Moody Center, and the East Northfield Water Company located in town. Institution administrations should develop a Memorandum of Understanding (MOU) with the Town that ensures public safety both on and off campus. The emergency action plan (EAP) and inundation area mapping for Grandin Reservoir needs to be shared with the Town. Northfield also needs to have updated inundation area mapping and an EAP for a dam failure at Vernon Dam, including a phone tree with town contacts, emergency procedures to follow, and strategic centers to utilize across town. According to input from town residents, Northfield used to be included in emergency preparedness activities, including practice drills, that are no longer provided since Vermont Yankee shut down. There may be other dams in Northfield's vicinity with significant or high hazard ratings, and the EAPs and emergency notification systems need to be redeveloped and tested by the Town.

Route 10 is a State Highway that shares its route with Northfield's Main Street. This means that a large number of heavy vehicles, some of them carrying hazardous materials, routinely travel

within close proximity of Northfield Elementary School, some senior housing, Town offices and safety, police, fire and medical services. The transport of hazardous materials through Northfield town center, presents the risk of a manmade disaster in the vicinity of the Town's essential municipal operations and in one of its most populated areas. An updated vulnerability assessment of chemical spills in transportation settings and fixed facilities in Northfield is needed.

Warming temperatures and climate change are impacting Northfield's forest health and water quality. Invasive species and pests, no longer kept in check by cold winters, are changing forest composition, reduced forest cover over streams is harmful to cold water fish resources, forest management is more difficult with warmer winters and less frozen ground for accessing certain forested areas for logging, and land owners may be in need of education and support with implementing climate resilient management techniques in Northfield's forestland. Healthy forests provide important ecosystem services, including water filtration. Recent testing in the Grandin Reservoir, the drinking water source for the East Northfield Water Company serving the Thomas Aquinas campus, Moody Center, and a number of private residences nearby, has shown elevated levels of bacteria. The East Northfield Water Company is facing the need for installation of a costly filtration plant or the development of a new drinking water source – also costly. Funding is needed to help review current engineering assessments of East Northfield Water Company and for engineering studies to determine the Town's best options for safeguarding and managing Grandin Reservoir's water.

Specific Categories of Concerns and Challenges

Flooding and Road Washouts

The small streams and rivers in Northfield can swell quickly with stormwater brought by heavy rain. Culverts regularly get clogged with debris leading to a buildup of pressure at the culvert inlet which can lead to flooding, road damage and washouts. Undersized and failing culverts can also lead to flooding and road washouts, and the increasingly intense rain events impacting Northfield are exacerbating this major challenge.

Key areas of concern include **others?**:

- 4 Mile Brook Road
- Caldwell Road
- Gulf Road
- Northfield Road in Warwick
- Warwick Road in Northfield

In Northfield, the 100-year floodplain covers about 2,283 acres, or approximately 10 percent of the town, including an estimated 20 acres of developed residential land, less than 1 acre each

of industrial use and commercial use, and 3.6 acres of public/institutional. Much of the floodplain consists of agricultural land or forest. The north end of town near the State boat ramp and the Lower Farms area along the Connecticut River are flood prone areas in Northfield. [updates?]

Wetlands act as flood storage, and meadows and hayfields that are growing back into brush may be doing a better job at storing water. Identifying and implementing nature based solutions through stronger wetland and waterway protections, land conservation, and incentives for landowners to protect key areas on their land could help ensure these eco-system services continue to mitigate flooding and other climate change impacts.

Mapping of structures/roadways/infrastructure vulnerable to flooding should include the 100-year floodplain and other known flood-prone areas for both current conditions and projected precipitation levels under future climate conditions. An inventory of structures and land uses in the mapped river corridor and 100-year floodplain are needed in order to expand the risk assessment for flooding and fluvial erosion hazards and identify possible mitigation measures.

Northfield could also be impacted by dam failure at significant and high hazard dams in town, including at Grandin Reservoir, and in neighboring communities, such as Vernon Dam in Hinsdale, New Hampshire. The inundation area mapping for these dams needs to be shared with the Town of Northfield in order to inform emergency response planning.

Power Outages

Another major hazard facing Northfield is downed trees and power outages. Many households do not have a generator. A series of strong storms in 2020 caused numerous power outages within weeks of each other. Storms brought high winds that damaged town trees which fell on power lines, blocked roads, and pulled wires to the ground in town center. Northfield also has many remote locations in town where residents get isolated if trees block the road.

Areas most vulnerable to power outages include town center and [others?]:

- Main Street

The Town and residents need to plan for long-term outages, beyond one week. The 2008 ice storm left many areas without power for up to 5 weeks and this could happen to Northfield too. A long-term sheltering plan is needed that can accommodate residents on both sides of the Connecticut River. The largest potential emergency shelter, Pioneer Valley Regional School (PVRS), is on the west side of the river and would be inaccessible to the majority of Northfield residents if the bridge were impassable. PVRS may need to be reassessed for readiness to provide long-term shelter, circulation and ventilation to help reduce the risk of infectious disease, and backup power options, including clean energy with on-site generation and storage. Planned energy and air quality improvements to Northfield Elementary School will make it

suitable for use as a shelter on the east side of the river, but it may be too small. Backup power options are needed to help residents get through power outages.

Energy Resilience

Related to power outages, improving energy resilience in homes and Town buildings is a major need and challenge. There is a small solar PV array located on the south facing roof of the pavilion behind Town Hall, and the Northfield Energy Committee (NEC) has been working on upgrades to Town buildings to make them more energy efficient and properly ventilated. In 2018, NEC received Green Communities Grants to reduce energy demand and utility costs at Northfield Elementary School (NES) through building envelope and lighting improvements. A 2020 Green Communities Grant will fund additional energy conservation measures at NES that will address heating and ventilation systems, including replacement of inefficient heating controls and improved heat delivery units. In addition to making the existing equipment heat more efficiently and provide greater comfort, they will be able to accommodate future upgrades, such as air source heat pumps. The final component of the NES upgrades is the installation of heat recovery ventilators (HRV) to provide adequate year-round ventilation and improved air quality while minimizing heat loss. The selected HRV system is designed for schools, is quiet, and clinically proven to help those who struggle with allergies and asthma.

The remainder of the 2020 Green Communities grant will be used to purchase and install a cold-climate air source heat pump at the Dickinson Memorial Library. The Library had window inserts installed in the building, which reduced airflow and heat loss. However, the library is now faced with the need for improved ventilation brought by the COVID-19 pandemic and needs guidance to figure out what ventilation upgrades are needed and how to get implementation funding for the work. The library serves as a heating and cooling center during normal hours, and has added extended hours during extreme situations. The library offers seating, bathroom facilities, running water, and is universally accessible as long as the power is on for operating the elevator. The extremely sturdy, stone, town-owned building is well-armored against wind, snow, and ice hazards. It does not have a generator or the hard wiring upgrades for connecting one, so many of its key offerings, including universal accessibility may be lost during power outages.

Moving forward, the Committee is interested in looking at on-site solar and battery storage as a resiliency strategy for other town buildings, assessing energy efficiency upgrades at the Town Highway Department, and ensuring that requirements associated with major facilities upgrades at the waste water treatment plant, such as a new office building and other physical plant changes are built to high energy efficiency standards, and that increased energy usage of new equipment and operational procedures and structures is managed through clean energy

generation. Exploring options for newer systems that utilize the waste itself as a source for heat exchange is also of interest to the Energy Committee. Additionally, public outreach to residents with information about incentives for installing clean energy options in homes, especially combined with back-up battery storage, was also identified as a strategy.

Communication Infrastructure

Existing communication infrastructure issues and vulnerabilities could be exacerbated by hazard impacts. Town bylaws may need updating to prevent wind-related damage, protect nearby roads and utilities, and ensure regular inspection and maintenance. Adding battery back-up power to the cell tower is in process, and is expected to provide up to seven days of back-up power. There is still a need to address communication redundancy for residents. A wireless broadband solution could be implemented to help with this issue. The radio tower on Mount Grace has back-up power. Plans are in the works to replace the tower with a new, taller tower that will include emergency communication channels and back-up power. This is being done by AT&T with funding from Homeland Security.

Private Wells for drinking water

Well owners need support and guidance on how best to keep their wells safe and productive. Northfield does not have a backup public water supply, and while the Town works to determine how best to cope with the elevated bacteria levels in Grandin Reservoir, the water supply for Thomas Aquinas College and surrounding private homes and whether to pursue a new public drinking water source, keeping residents' private wells safe and productive is vitally important. A helpful strategy in the interim is to formulate a plan for better winter road practices to help mitigate potential for road salt contamination in drinking water wells. The Town can use less salt on the roads, and there are more environmentally friendly materials, but these are expensive. The Town can also implement water conservation strategies for municipal buildings and educate residents to do the same at home.

Forest Resilience

74 percent of the land cover in Northfield is forested and contributes to a large regional greenway of contiguous forestland that provides critical habitat and supports biodiversity. Forests in Northfield will be faced with stresses due to climate change and human land management that can be expected to shape their ecology and resilience over time. Sustainable forestry practices that strike a balance between environmental protection and economic development can provide a sustainable source of wood products, increase the diversity of habitats for wildlife, provide jobs, offer places for recreation, and contribute valuable ecosystem services such as water purification. Conserving resilient forests and the linkages between them by limiting fragmentation will help plant and animal species find suitable

habitats and endure the stresses of climate changes. Large, intact forested areas will also be more likely to recover from extreme events such as droughts, wind storms, ice storms, and flooding.

Maintaining healthy forests well into the future will necessitate addressing stressors like invasive species and forest pests in an effort to increase forest resiliency. Forest landowners may take both passive and active management approaches to forest stewardship. Financial incentives to conserve and manage forestland for climate resiliency and carbon sequestration and storage could help landowners maintain healthy forests in Northfield that in turn mitigate climate change and its impacts.

There is a need to promote forest stewardship practices on private and public forestlands that produce more resilient forested landscapes to reduce the risk from drought, severe weather, invasive plants and pests, and other climate change impacts.

Firstlight Power and the Connecticut River

Significant pool fluctuations on the Connecticut River related to operations of Northfield Mountain pumped storage facility are contributing to on-going streambank erosion, degradation of riparian habitat, loss of farmland, ice jams, and degradation of historic assets and recreational facilities along the river. Since the Northfield Mountain Pumped Storage Project came on-line in 1972, landowners in Northfield have watched mature trees in the riparian buffer and prime farmland soils slump and topple into the Connecticut River. Pauchaug State Boat Ramp, the most heavily used recreational boat launch located in the northeast of town requires fairly frequent dredging. FirstLight owns most of the riverbank and could be instrumental in implementing bank stabilization measures that are critically needed to mitigate on-going degradation of these environmental, cultural, and infrastructural assets. Seasonal monitoring for ice buildup and ice jams is also needed. The Town should continue working closely with the FRCOG and other local and regional stakeholders during the FERC and 401WQC permitting processes to ensure that the Town's voices are heard.