Action Grant Case Study
Town of Uxbridge

Municipality/Nonprofit Organization: Town of Uxbridge
Project Title: Integrated Water Infrastructure Vulnerability Assessment and Climate Resiliency Plan
Grant Award: $288,904
Match: $96,278 ($67,302 in-kind services, $28,975 cash match)

Community Overview:
Uxbridge is a town in Worcester County, Massachusetts. It was first settled in 1662, and was incorporated in 1727. Uxbridge is 16 miles south south-east of Worcester, 20 miles north-northwest of Providence, and 46 miles southwest of Boston. It has a Town Meeting form of government. Uxbridge marks the center of the Blackstone Valley Heritage Corridor, known for America's earliest industrialization for textiles, power looms for woolens, cashmere woolens and manufacturing of clothing and military uniforms. The first Air Force Dress Uniform "Uxbridge Blue" was made here. The Town of Uxbridge has a population of approximately 14,000. The Town spans 30.4 miles and is located in the Blackstone River watershed.

Description of Climate Impact:
Extreme weather and natural and climate-related hazards are an increasing concern for the communities of Massachusetts, including the Town of Uxbridge. The Town completed the MVP Planning process in 2018, and identified flooding as a top hazard facing the Town.
The threat from flooding has been growing with the increasing frequency of major storm events that deliver large amounts of precipitation over a short time period. This threat is expected to continue to grow due to climate change: the Northeast Climate Adaptation Science Center at the University of Massachusetts Amherst projects that, given a medium to high future emissions pathway, Uxbridge will experience seven inches of additional rainfall per year by the end of the century. Conversely, seasonal drought conditions may become more frequent as precipitation becomes more concentrated in extreme intensity events and winter snow pack is reduced. These changes in precipitation patterns and major storm/drought frequency and intensity have already been observed in Uxbridge—the Town has experienced flooding-related issues from heavy precipitation events and, most recently, the 2015 – 2016 drought threatened both public water supplies and private wells across Town. Much of Massachusetts, including southern Worcester County, has experienced severe to extreme drought conditions during the late summer and fall of 2020 according to the United States Drought Monitor.

Project Goals:
As drought and flooding were identified as the two Top Priority Hazards in Town, the primary goal of this project was to analyze these hazards as they relate to water infrastructure and to provide both site-specific and Town-wide recommendations to increase resiliency. A key objective of the project was to promote climate resiliency measures that considered both

infrastructure and natural systems solutions, which was intended to help local decision makers think more strategically about ways to utilize natural systems to provide more effective strategies to reduce these risks while also benefiting ecological health.

Approach and Result:
The project team conducted a series of four separate technical assessments of water infrastructure, including road-stream crossings (bridges and culverts), dams, stormwater, and public and private water supply wells. These assessments included review of background information, studies, and mapping, as well as screening-level evaluations (using GIS) and field data collection and analysis, culminating in the development of technical memoranda for each assessment. Two public stakeholder sessions were also held to solicit public feedback on the progress and findings of the assessments.

- **Road-stream crossings:** 91 road-stream crossings were assessed in the field using methods that incorporated the North Atlantic Aquatic Connecticut Collaborative stream crossing survey protocols. These field assessments were followed up with desktop vulnerability assessments, which included an analysis of existing and future hydraulic capacity, geomorphic vulnerability, structural condition, and aquatic organism passage, to determine a priority ranking score for each crossing. Of the assessed structures, 15% (14 structures) were rated as high priority for upgrade or replacement to increase resilience and reduce flooding risk.
- **Dams:** 20 dams, both Town and privately-owned, were assessed through limited visual condition assessments and review of relevant Office of Dam Safety reports. Conditions were documented and recommendations made for each dam. Five dams were identified as high priority for removal to reduce flooding risk and increase resilience in Town.
- **Stormwater:** A green infrastructure assessment was performed to identify retrofit opportunities across Town that would increase flood resiliency and improve or protect water quality. Thirty-one properties, mostly Town-owned, were selected for assessment for retrofit opportunities based on GIS screening results and input from the Town and community on areas with known stormwater problems. Concept-level designs, including project cost estimates, were developed for the top ten priority sites. A review of local bylaws with consideration for green infrastructure and nature based solutions was also conducted.
- **Public and private water supply wells:** An analysis was performed to identify vulnerabilities of and related impacts on the Town's public and private water supplies, including flooding, drought, and the impact of known and emerging contaminants (manganese, PFAS, etc.). The Town's ability to meet current and projected future water supply demands, in conjunction with these vulnerabilities, was also analyzed. Site-specific and Town-wide recommendations were made to increase resilience of the water supply system and ensure the Town's capacity to meet current and future water demands.

These assessments, combined with input from residents and the project Core Team, culminated in the development of Uxbridge's Integrated Water Infrastructure Vulnerability Assessment and

Climate Resiliency Plan. This plan summarized the findings of each of the four technical assessments, and also provided site-specific and Town-wide policy and regulatory review recommendations and potential funding sources for project implementation.

The project website contains deliverables related to each of the four technical assessments:
https://www.uxbridge-ma.gov/board-health/pages/mvp-grant-1

Lessons Learned:
The MVP Core Team, formed to support the Planning process, has opened up conversations among diverse Town departments that makes use of expertise in health, infrastructure, planning, conservation, and emergency services to guide decision making. The group has now successfully won and guided two MVP Action Grant awards that build on one another, highlighting the importance of having a committed group of Town staff talking to one another on issues of climate change and resilience.

Due to the social distancing requirements of the coronavirus pandemic, later stages of the project required virtual collaboration with the Core Team, project partners, and the public. This required navigating virtual platforms to learn the most effective and engaging methods, especially in terms of relaying the findings of the project to the community and gathering public input on the project. This proved a valuable learning process if virtual collaboration and outreach is required for future projects.

Partners and Other Support:

- **Fuss and O'Neill** served as the primary consultant for the project. Fuss & O'Neill conducted technical assessments for culverts and bridges, dams, and stormwater (green infrastructure) and was responsible for the development of the Integrated Water Infrastructure Vulnerability Assessment and Climate Resiliency Plan.
- **Resilient Civil Engineering** conducted the technical assessment of public and private water supply wells, with mapping analysis provided by Fuss & O'Neill.
- **Central Massachusetts Regional Planning Commission (CMRPC)** conducted a review of local bylaws with consideration for green infrastructure and nature based solutions.