

TOWN OF ARLINGTON

Community Resilience Building Workshop Summary of Findings & Recommendations

May, 2018

Photo Credit: Juhan Sonin





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OVERVIEW

The Town of Arlington is experiencing more frequent and destructive extreme weather events as a result of climate change. Flooding from the July 2017 rain storm, and the record-breaking snow storms of 2015, exposed both vulnerabilities and strengths in town and across the region. Events like these reinforce Arlington’s urgent need to prepare for both present and future climate-related hazards.

Acting in recognition of this need, the Town of Arlington enrolled in the **Municipal Vulnerability Preparedness (MVP) program** administered by the Massachusetts Executive Office of Energy and Environmental Affairs. The MVP program provided the Town with a \$23,000 grant to implement the **Community Resilience Building Workshop (CRB)** planning process, developed and tested by The Nature Conservancy (www.communityresiliencebuilding.com).

The CRB process was carried out over several months, culminating in an intensive two-day workshop with community stakeholders, held on January 25, 2018 and February 2, 2018. The workshop raised awareness, facilitated dialogue and experience-sharing, and generated ideas and momentum for building a more resilient Arlington.

The workshop’s central objectives were to:

- Define top local natural and climate-related **hazards** of concern;
- Identify existing and future **strengths and vulnerabilities**;
- Develop **prioritized actions** for the community; and
- Identify **immediate opportunities** to collaboratively advance actions to increase resilience.

The Arlington **Department of Planning and Community Development** organized the workshop in collaboration with a core group of eleven Town staff members and Arlington residents. **Core group** members represented different stakeholder interests, including planning, public works, public safety, conservation and



Photo Credit: Kleinfelder

The workshop brought key stakeholders together.

open space, health, energy, business, and sustainability. This group selected **Kleinfelder** as the Town’s state-certified MVP consultant to provide technical assistance on climate resiliency planning, workshop facilitation, and reporting. Together, they worked to set goals, identify participants, gather relevant background material, and organize logistics for the workshop.

Multi-stakeholder collaboration was critical to developing a holistic assessment of the community’s climate risks and resiliency opportunities. Approximately 30 stakeholders participated in the workshop, including Town elected officials, Town department staff, residents, and representatives from non-profit organizations and local businesses. They were assigned to small diversified teams for completing various tasks during the workshop.

This report provides a summary of the concerns, ideas, and priorities shared by these participants during Arlington’s two-day CRB workshop.

TOP HAZARDS & VULNERABLE AREAS

On the first day of the workshop, participants learned about and discussed six locally relevant climate hazards:

1. Extreme heat,
2. Storm surge and sea level rise,
3. Heavy rainfall,
4. Ice and snow storms,
5. Drought, and
6. Wind.



Photo Credit: Kleinfelder



Presentations on climate hazards were followed by small group discussions.

Kleinfelder presented historical data and best available climate change projections regarding the frequency, magnitude, and impact of each hazard in Arlington. The presentation referenced watershed- and county-level climate change projections from the University of Massachusetts Amherst Northeast Climate Science Center, along with more localized studies from the City of Cambridge. Presentation slides are attached to this report for reference (Appendix A).

After each hazard was presented, Kleinfelder facilitated a large group discussion on how each hazard had impacted Arlington in the past and concerns for the future. Participants shared experiential knowledge about personal property damage, transportation and utility disruptions, the July 2017 extreme rainfall event, and flooding around Mill Brook and the Mystic River. Working in small groups, participants prioritized four top hazards on which to focus for the remainder of the workshop.

Following the discussion on hazards, participants worked in small groups to identify **infrastructural, societal, and environmental features** related to these hazards. Features were categorized by their location, ownership, and whether they were considered to be a vulnerability, strength, or both. Participants used maps showing the location of community resources in relation to projected hot zones and rainfall, storm surge, and sea level rise floodplains. The maps and list of community resources are attached to this report for reference (Appendix B).

TOP HAZARDS

- **Heavy rainfall,**
- **Ice and snow storms,**
- **Extreme heat, and**
- **Storm surge and sea level rise.**

Heavy rainfall and ice/snow storms were identified as the hazards having the greatest direct impact on Arlington in the recent past and at present. They impact many private properties, public services and infrastructure, and vulnerable populations in the community. Responding to these hazards is a strain on public resources.

Extreme heat, while a historically infrequent hazard, is likely to have increasing impacts in the next 10 years and beyond. Impacts of extreme heat on human health, particularly for vulnerable populations, as well as natural resources and energy infrastructure were of high concern to participants.

Storm surge and sea level rise may have severe long-term impacts on neighborhoods and infrastructure in Arlington. At present sea levels, the Amelia Earhart Dam prevents storm surge from flowing up the Mystic River to Arlington. However, an extreme event could send storm surge over or around the dam due to sea level rise by mid-century. Vulnerable areas of town along Alewife Brook and Mystic River would face increasing risks of flooding as sea level rise continues through the end of the century. Even though Arlington may not be directly impacted in the near-term, planning needs to begin now because solutions will likely take significant time, money, and regional coordination to implement.

AREAS OF CONCERN

The tables in the subsections below summarize the vulnerabilities and challenges identified by participants, with respect to the top hazards. Note that rainfall and storm surge/sea level rise have been combined here under the “Flooding” sub-header.



Transportation

Flooding

Vulnerable Locations

Mystic Valley Parkway (near cemetery, at Summer Street), Minuteman Bikeway, Park Avenue, Highland Avenue, School Street, James Street, Garden Street, Massachusetts Avenue bridge over Alewife Brook, MBTA Alewife Station, Grove Street bridge, Brattle Street bridge, Forest Street bridge, Route 2A culvert from Spy Pond, East Arlington roads.

Management Challenge

Emergency access/evacuation, economic impacts on commuters.

Snow/ice

Vulnerable Locations

Narrow side streets, Massachusetts Avenue corridor, MBTA subway system.

Management Challenges

Sidewalk clearing, street parking/bans, snow storage, emergency access, economic impacts on commuters.

Heat

Vulnerable Locations

Massachusetts Avenue corridor.

Management Challenges

Limited bus shelters, limited street tree canopy coverage, high mortality of street trees.

Other Infrastructure

Flooding

Vulnerable Locations

Amelia Earhart Dam, Mill Brook, Alewife Brook, Reeds Brook, Arlington Reservoir.

Management Challenges

Reservoir spillways/gates, stormwater/sewer infrastructure, electric transmission (e.g., Alewife substation), electric distribution, natural gas station (next to DPW), natural gas lines, fiber optic network.

Snow/ice

Vulnerable Locations

Throughout town.

Management Challenges

Above ground electric lines and utilities.

Heat

Vulnerable Locations

Throughout town.

Management Challenges

Electric transmission and distribution.

Ecosystems

Flooding

Vulnerable Locations

Mill Brook, Spy Pond, Arlington Reservoir, Mystic Lakes/River, Alewife Brook, McClellan Park/Reeds Brook, Mugar property.

Management Challenges

Water quality impacts from runoff, sewer overflow, and landfill contaminants; tree health, aquatic invasives, pests/vectors, recreational uses, development of open space, influence of geology/groundwater/topography on flooding, and natural debris/dams in waterways.

Snow/ice

Vulnerable Locations

Throughout town.

Management Challenges

Water quality impacts from road treatment runoff and snow storage area melt, tree health.

Heat

Vulnerable Locations

Massachusetts Avenue corridor, East Arlington, surface water bodies throughout town.

Management Challenges

Tree health impacts from change in climate zone, pests, drought; water quality; aquatic invasives; pests/vectors.



Vulnerable Populations

Flooding

Vulnerable Locations

Mill Brook, East Arlington.

Management Challenges

Access to/from critical services (police, fire, ambulance, medical), senior and disabled population, disadvantaged residents, food delivery services, business impacts, emergency communications and education.

Snow/ice

Vulnerable Locations

Throughout town.

Management Challenges

Access to/from critical services, senior and disabled population, shoveling sidewalks/crossings, heating costs, power loss, business impacts, food delivery services.

Heat

Vulnerable Locations

Massachusetts Avenue corridor, East Arlington.

Management Challenges

Senior and disabled population, outdoor workers, disadvantaged residents, student athletes, health, cooling access/cost, power loss, grocery stores and pharmacies (power loss), business impacts, public school buses (air conditioning), emergency communications and education.

Facilities

Flooding

Vulnerable Locations

DPW and Police station, Armstrong Ambulance, Arlington High School property, open space/recreational facilities along water bodies (Alewife Brook, Mill Brook, Spy Pond, Arlington Reservoir), schools (power loss), senior/public/affordable housing, Russell Common (impervious area).

Management Challenges

Vulnerable populations, access to/from critical services, business continuity.

Snow/ice

Vulnerable Locations

Throughout town.

Management Challenges

Leasing cost and insufficient storage space at Poet's Corner.

Heat

Vulnerable Locations

Town Hall and Robbins Library (records, municipal services), schools (air conditioning, power loss), Senior Center, Russell Common, senior/public/affordable housing.

Management Challenges

Municipal energy costs, emergency power, lack of awareness of cooling centers.

Vulnerable Neighborhoods

Flooding

Vulnerable Locations

East Arlington, Colonial Village, Mill Brook corridor, Reeds Brook.

Management Challenges

Residential property damage, access to/from critical services, evacuation, utility impacts, continuity of public services.

Snow/ice

Vulnerable Locations

Throughout town.

Management Challenges

Transportation, utilities, tree health.

Heat

Vulnerable Locations

Massachusetts Avenue corridor, East Arlington.

Management Challenges

Walkability, electric transmission/distribution, tree health (street trees and private trees), lack of awareness of cooling centers.



CURRENT CONCERNS & CHALLENGES PRESENTED BY HAZARDS

Arlington has experienced notable impacts from climate hazards in recent years, especially heavy rainfall events (both short and long duration) and snow and ice storms.

The flooding impacts from a short duration rainfall in July 2017 were thoroughly discussed during the workshop. During this storm, the Police Department received numerous reports of street flooding at locations across town. These areas are shown in the rainfall flooding map in Appendix B. Many areas in the FEMA 1% annual chance flood hazard zones, including along Mill Brook, the Mystic River, and Alewife Brook, also flooded. This was exacerbated by fallen trees which created natural dams along streams.

The event was widely documented on local news and social media. Workshop participants shared stories of their experiences during this event, as well as previous floods (e.g., March 2010), and identified specific facilities, transportation routes, residential areas, and businesses that were impacted. Arlington Village Shops in Arlington Heights, owned by one workshop participant, was among the businesses that incurred costly flood damages. There was significant concern that these hazards would cause increasing damage and disruption in the community due to climate change.

Central to the discussion about both hazards and solutions was the recognition that the primary infrastructure related to flooding hazards in town - the storm drain system is not well

understood. Participants identified a variety of factors that could influence stormwater flooding in town, including geology, groundwater levels, topography, drainage systems, land use, and dam/reservoir management. They were also concerned that decisions made by private property owners, neighboring communities, and regional agencies could be worsening Arlington's flood risks.

Arlington has also repeatedly experienced the impact of extreme snow storms, including during the record-breaking winter of 2015. Events like this have disrupted roadways, transit, utilities, and other public services and stretched municipal resources. Elderly and vulnerable populations are often the most affected by these types of weather-related events.

The Fire Department experiences an increase in calls during snow storms, particularly to assist mobility-impaired residents, seniors, and people with health issues. These events often demand the entire staffing capacity of the department, making it difficult to respond to the many calls received and creating a backlog of non-urgent workload.

The impacts of snow on access create additional emergency response challenges. During another snow storm, the Fire Department had to respond and provide treatment to a person with a minor wound because their guardian was unable to access their vehicle.

Snow and ice storms also impose costs on residents, businesses, and the Town government. In 2015, parking was banned on narrow side streets for extended periods due to the accumulation of snow from successive storms. Public parking lots were inadequate to accommodate residents' vehicles. Maintaining the accessibility of crosswalks and curb cuts was also a major challenge. In addition to high costs for plowing and road treatment (e.g., \$90,000 to clear Massachusetts Avenue), the Town used heavy equipment to remove snow from certain streets, pay to haul out snow (200 tractor trailer loads), and lease a property to store snow. The Town also lost parking meter

Photo Credit: Anthony Keefe



Participants described past events like the March 2010 flood in East Arlington at Herbert Rd and Lafayette St.



revenue because people could not park along Massachusetts Avenue.

These are just a few examples of how Arlington has been impacted by flooding and snow/ice storms in the recent past. Workshop participants also thoroughly discussed their concerns regarding potential impacts of extreme heat and flooding from storm surge and sea level rise. Identified areas of concerns are summarized in the list above and sections that follow.

SPECIFIC CATEGORIES OF CONCERNS & CHALLENGES

Mill Brook

Workshop participants identified Mill Brook as an area of high concern. During heavy rainfall events, Mill Brook surges over its banks causing impassible roads and damage to public and private properties. Since Mill Brook serves as the floodway for the Arlington Reservoir, it often floods as the water level in the Reservoir rises. The Arlington Master Plan identifies the Mill Brook corridor and the Reservoir as resources to be protected for their recreation value, their ability to connect key economic areas along Massachusetts Avenue, and their capacity for flood control.

Current challenges facing Mill Brook are:

- Inaccessibility,
- Hydraulic impediments such as sharp turns and pinch points,
- Unstable shorelines,
- Mixed property ownership,
- Management of public and private storm drains,
- Presence of trash, natural debris, and poor water quality,
- Stability of underground channels, and
- Inadequate flood capacity.



Mill Brook overflows during heavy rainfall events, flooding roadways, facilities, and private property.

Water Quality

Water quality was identified as an ongoing issue across all the water bodies in Arlington. Surface waters, such as Spy Pond and Arlington Reservoir, are important recreational and habitat resources. However, their value is impacted by degraded water quality, and they require ongoing treatment for aquatic invasives, erosion control, and occasional dredging. With increased rainfall, participants were concerned that more stormwater runoff from roadways, residences, parking lots, and an unlined landfill would exacerbate existing water quality issues. Participants also highlighted concerns about the water quality impacts of roadway salt treatments and leakage and overflows from sewer systems, inside and outside of Arlington.

Transportation

Workshop participants identified numerous vulnerabilities in the transportation system related to the top hazards. This was such a critical concern because of the potential impacts on public safety and the economy. For example, people waiting for buses or walking through the Massachusetts Avenue corridor could be exposed to heat-related health risks. Flooding and snow storms increase roadway accidents, disrupt emergency response activities, and accelerate roadway degradation. Many of the routes potentially exposed to flooding would impact people's commutes to and from Boston. Because roadway drainage systems are not adequately sized or designed for future storms, these types of impacts could become more frequent.



Elderly Residents

As is trending in the Metro Boston region, Arlington has an aging population. This demographic group disproportionately depends on bus transit, affordable housing, food delivery, and access to medical services. Increasing hazards may impact the continuity of these and other services. Elderly populations also face heightened risks from hazard exposure, disruptions to utility services, and increased heat/cooling costs. The Town's weatherization and senior services programs help to mitigate many of these concerns. However, resources can be limited, particularly during emergency conditions and prolonged weather events.

Trees

Trees can help mitigate the impact of extreme heat and heavy rainfall. For example, there is an inverse relationship between urban tree canopy and surface temperature in Arlington. As trees on both public and private property become more important for the town's resilience, they would also face increasing environmental threats.

Arlington's tree canopy has suffered recent losses from a variety of climate hazards, including heavy rainfall events, snow and ice storms, the July 2012 microbursts, Hurricane Sandy, and flash droughts. Arlington is planting around 200 trees annually and has needed to remove 200 trees annually, resulting in net-neutral tree canopy.

High tree mortality rates in Arlington are interrelated with hazard exposure, siting and maintenance issues, increasing water requirements, lack of species diversity, and pests.

Approximately 56% of the trees in Arlington are Norway Maple. This lack of diversity poses a strategic risk for the town's tree canopy in the event of a pest outbreak. One participant noted that, since 2008, Worcester, Massachusetts has removed 35,000 trees to combat Asian Long Horn Beetle infestations. Planting decisions in Arlington prioritize native species that are less vulnerable to climate hazards; the Arlington Conservation Commission's Wetlands Protection Regulations prohibit the use of invasive species in permitting projects, however, the Town Bylaw does not yet establish specific climate change policies applicable throughout the town.

Municipal Facilities

Schools, the Department of Public Works (DPW) property, and Town Hall Municipal Complex were identified as being vulnerable to several hazards during the workshop. The DPW and Arlington High School properties are located on top of Mill Brook culvert, which flood during heavy rainfall events.

Schools play a pivotal role in the greater social infrastructure of the community. The High School is located within the FEMA floodplain, making it potentially vulnerable to flooding. The High School is also located within an urban heat island, due to the large expanses of pavement in the surrounding area. The Town plans to rebuild the school on the existing site in the coming years, and participants stressed the importance of incorporating sustainable and resilient practices in this development process.

The DPW site also falls within the FEMA floodplain. The DPW site and access to it are critical during and after flood events for disaster response and recovery purposes. Flooding could destroy road salt stock, other supplies, and equipment stored in the yard. The Town is also planning to renovate and replace the DPW facilities on the same site.

Town Hall and the nearby municipal complex are home to many of the lifeline services that residents rely on for support and information. There was an expressed interest by participants to integrate resiliency to ensure that Town Hall and the complex can continue to operate during prolonged power outages and heat waves. Currently, Town Hall does not have air conditioning or an emergency generator. There were also concerns that important hard copy files and historical records that are unprotected from the elements could be lost.

Energy Infrastructure

As Arlington begins to see warmer climates, energy demand is expected to shift from heating to cooling. While heating systems rely on a more diverse set of energy sources, air conditioning systems are largely dependent on electricity. Meanwhile, vehicle energy sources may also shift from gasoline to electricity. Participants were concerned that Arlington's electric transmission and distribution infrastructure would not have enough capacity to handle the higher



demands.

Electrical infrastructure is also vulnerable to damage from flooding, snow/ice storms, and wind. Furthermore, the Town's policies do not require utility owners to make proactive upgrades. This could result in increased power outages, with cascading impacts on public services, vulnerable residents, and businesses.

Amelia Earhart Dam

The Amelia Earhart Dam situated on the Mystic River, between Somerville and Everett, plays two important flood control functions. In heavy rainfall events, it has three pumps (and room for a fourth) that are used to lower upstream water levels. It also acts as a barrier to storm surge that would otherwise be driven up the river towards Arlington.

Participants identified several concerns with the dam. First, three pumps may be inadequate to mitigate riverine flooding in future heavy rainfall events. Second, as sea level rises and storms become more powerful, the likelihood increases that storm surge could flow around or over the dam. Finally, the dam is owned and operated by the Massachusetts Department of Conservation and Recreation (DCR) and is therefore outside of Arlington's direct control.

CURRENT STRENGTHS & ASSETS

The social connection and activism of Arlington residents was identified as an important overarching strength of the community. It provides a strong foundation for building future resilience to climate change and extreme weather events. The following list captures the wide range of other strengths identified by workshop participants:

- The interest in and commitment to building resiliency, evident from the participation of a broad group of stakeholders in the workshop, can provide support and momentum.
- There are many community groups with overlapping membership that could be leveraged in an emergency, especially if organized in advance.



Photo Credit: MaUSHarbors.com

Amelia Earhart Dam helps mitigate current flooding but is vulnerable to sea level rise.

- The Minuteman Bikeway is a great resource that enhances connectivity throughout the town and provides social, infrastructural, transportation, and environmental benefits.
- Arlington's Summer Street Sports Complex, Boys and Girls Club, surface water bodies, parks, and trails provide residents with refuge from hot weather.
- Arlington has significant tree canopy coverage in residential neighborhoods which can help mitigate increasing heat and associated cooling costs, as well as assist with stormwater management.
- Summer Street, which runs parallel to Massachusetts Avenue, provides a redundant evacuation route outside of the FEMA floodplain.
- The Ed Burns Arena is generator-ready and has the potential to provide shelter and cooling for people, outside of the FEMA floodplain.
- Thompson Elementary School, rebuilt in 2013, is a designated emergency shelter outside of the FEMA floodplain. It has an emergency generator, is the staging area for all school meals, and has a splash pad.
- The upcoming replacements of Arlington High School and the DPW facilities, both located in the FEMA floodplain along Mill Brook, are opportunities to incorporate resiliency and sustainability into the design of critical facilities.
- The Russell Common and Sports Complex parking lots can provide emergency parking for snow and flood events.



- There are several grocery stores, a food pantry, food delivery service, and community gardens in town which may enhance the resiliency of the food system.
- Treatment programs at Spy Pond, the Reservoir, Hills Pond, and the Mystic Lakes are helping to control invasive aquatic plants.
- Arlington’s surface water bodies have more stormwater storage capacity than is currently used to manage flooding.
- The clustering of important municipal facilities provides opportunities to consider energy micro-grids.
- The Amelia Earhart Dam has space for a fourth pump, a regional adaptation that could be needed in the future.
- The Links program connects high school students with elderly residents for snow shoveling support.

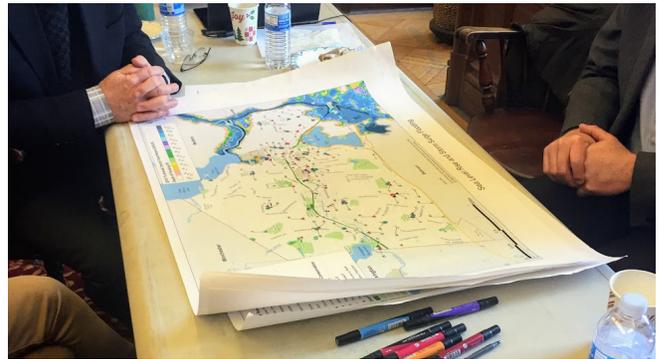


Photo Credit: Kleinfelder

Participants generated ideas for enhancing resilience and then built consensus on priorities.

TOP RECOMMENDATIONS

Implement multi-benefit solutions along Mill Brook. All four groups recommended actions to improve conditions along the Mill Brook corridor, from Arlington Reservoir to Mystic Lakes. Flooding in this area affects important public services as well as the economic center of the community.

The Town has recently completed a corridor-wide hydrological study to better understand flooding locations, causes, and solutions. Once effective solutions can be identified to mitigate flooding along Mill Brook, the Town should evaluate and prioritize them for implementation over the short and long-term. The prioritization and implementation processes should involve and educate private landowners along Mill Brook.

Priority should be given to effective flood mitigation projects that achieve multiple community objectives for Mill Brook. Objectives may include improving water quality, structural stability, daylighting, recreational use, pest and vector control, economic development, and urban heat island mitigation.

Address flooding and heat hazards in East Arlington. East Arlington is more exposed to flooding and heat hazards than any other neighborhood in Arlington. Its exposure to flooding is related to its topography and proximity to Alewife Brook and the Mystic River. Its high heat exposure is due to the density of housing and limited tree cover and pervious surfaces.

DCR is a critical stakeholder for the Town to work with on solutions to flooding in East Arlington. DCR is responsible for critical green and gray

RECOMMENDATIONS TO IMPROVE RESILIENCE

On the second day of the workshop, Kleinfelder presented case examples of community resilience actions potentially relevant to Arlington (Appendix A). Participants then worked in small groups to carry out the following steps:

1. Generate lists of potential actions to reduce the vulnerabilities and reinforce the strengths identified during the first workshop;
2. Consider whether the actions address more than one top hazard, are intermediate steps, or strengthen existing initiatives;
3. Prioritize actions and differentiate them as short-term, long-term, and ongoing; and
4. Identify their top three recommendations to improve resilience to the top hazards in Arlington.

The Top Recommendations section synthesizes the top priorities presented by the groups. The lists that follows captures other potential actions identified by workshop participants, organized by priority.



flood mitigation infrastructure along Alewife Brook and the Mystic River. The Town should open an ongoing dialogue to encourage DCR to take all necessary actions to increase the flood protection provided by the Amelia Earhart Dam, Mystic River Reservation, and Alewife Reservation.

DCR needs to take actions to address riverine, storm surge, and sea level rise flooding. Such actions could include elevating the Amelia Earhart Dam and adding pumping capacity, creating multi-use levees and adding storage capacity along the reservations, and participating in regional dam/reservoir management schemes.

Realistically, the actions themselves could take decades to plan, design, fund, and implement. In the near-term, the Town should create tailored plans for evacuation, sheltering, communications, and providing ongoing public services for a scenario in which East Arlington is exposed to a 500-year flood.

To mitigate the urban heat island in East Arlington, the Town should prioritize the neighborhood as part of its ongoing tree planting and maintenance activities, using native resilient species. This program should use the heat map presented in the workshop and recently collected street tree inventory data to identify target locations where tree planting is most needed. In planning these activities, the Town should review planned roadway, sidewalk, and utility upgrades to ensure compatibility and identify opportunities to incorporate tree planting in ongoing work. This type of exercise, linking planning and operations, could be a pilot for a more comprehensive Green Streets Master Plan, described below.

Address heat hazards along Massachusetts Avenue corridor. Heat maps used in the workshop clearly show that Massachusetts Avenue is surrounded by an urban heat island. Many Arlington residents and workers walk through this corridor to access the bus transit system, local businesses, and civic facilities. As extreme heat events increase, these uses will become more dangerous, especially for vulnerable populations.

Actions should be taken in the near-term by the Town and private owners to mitigate dangerous heat levels along the corridor.

As part of ongoing activities, the Town should plant more native and diverse tree species and increase pervious surfaces within the public right of way, especially around facilities used by vulnerable populations. The Town should study the feasibility of implementing a “road diet” along the corridor that could increase the area available for tree planting and green stormwater infrastructure, while also improving accessibility and bus transit operations.

Mitigating the heat island will also require that private owners, especially those with large flat roofs and large impervious parking lots, take actions on their own properties. The Town should support such action with education and consider incorporating new requirements or incentives in bylaws, regulations, and permitting processes.

Develop and implement green infrastructure projects, policies, and plans. Green infrastructure has the capacity to mitigate flooding and extreme heat, in addition to providing other social, economic, and environmental benefits. The Town should incorporate green infrastructure in its ongoing capital and maintenance projects, wherever feasible.

The Mill Brook corridor hydrological study, mentioned above, should be used in the near-term to evaluate the costs and benefits of different green infrastructure strategies to achieve flooding, heat, and water quality goals. Through the planning and implementation process, potential public investments in green infrastructure as well as policies affecting private property should be investigated.

Once effective solutions are identified, the Town should develop a Green Streets Master Plan. Such a plan should target, optimize, and coordinate capital and maintenance investments in trees, utilities, green infrastructure, and drainage systems.

The Town should concurrently review its existing plans, bylaws, regulations, and permitting processes, as well as models used by other municipalities, to identify potential mechanisms for effecting green infrastructure adoption on private property.



Incorporate resilience in the DPW and High School redesign. The Town is redesigning two critical municipal facilities that are located in FEMA floodplain along Mill Brook. The new facilities should be designed to be resilient to future heat and flooding hazards.

A climate change vulnerability assessment of both sites can inform conceptual designs for the future facilities. The assessment should produce estimates of future flooding and extreme heat levels to inform design criteria for the new facilities. The assessment should also develop resiliency recommendations and associated cost estimates for each facility.

The recommendations should address the key functional requirements of each facility. For example, at the DPW facility design and operational recommendations should be provided to maintain access and egress and protect supplies and equipment during a flood. For the school, design options should be recommended for resilient cooling systems and sheltering capacity. In addition, these sites are adjacent to each other and both have large available land areas. They should be evaluated for renewable energy generation with advanced battery storage, which could also serve as emergency power.

The assessment findings and recommendations can be used to inform requirements and as a base review for each stage of design.

Increase the functionality of Arlington's bike paths. The Town is launching a dockless bikeshare system. Docking locations should consider accessibility issues, and opportunities to improve connections. Policy changes should allow for pedal-assist bikes.

HIGH PRIORITY

The following actions are considered high priority:

- Incorporate climate projections for future rainfall storm events into drainage design criteria and the Town's stormwater bylaw.
- Implement ongoing improvements to public schools to assure continuity of operation in extreme weather events. Schools should have efficient cooling and heating systems, flood-protected access, and emergency generators, at a minimum.

- Prepare a plan to implement ADA improvements, decrease car dependency, and improve bus stop conditions and route inefficiencies.
- Evaluate the cost-effectiveness of acquiring Poet's Corner for snow, flood, and/or salt storage.
- Evaluate micro-grid opportunities with renewable energy and storage in locations that connect multiple Town properties.
- Advocate for Eversource to proactively improve electric transmission capacity.
- Evaluate establishing a stormwater utility to raise funds for necessary flood and water quality improvements.
- Address the vulnerability of Armstrong Ambulance and other businesses along the Mill Brook to flooding.
- Increase the capacity of the culvert from Spy Pond to Alewife Brook under Route 2.
- Coordinate with Cambridge, Belmont, Somerville, Winchester, and Medford on climate resiliency plans.
- Review and update the Environmental Design Review special permit criteria to encourage the consideration of climate change hazards and resiliency strategies.

MODERATE PRIORITY

The following actions are considered medium priority:

- Address the resiliency needs of elderly populations, including cooling centers, flood evacuation plans, improving bus stop shading, and continuity of care plans for services such as food delivery during extreme weather events.
- Conduct an energy audit of Town Hall, Robbins Library, and the Senior Center and make improvements such as white roofs and solar panels. Use dehumidification to enhance paper file longevity or digitize files.
- Initiate a Regional Dam Management Plan, which includes storage improvements and procedures for lowering Arlington Reservoir, Spy Pond, and Mystic Lakes ahead of storms.



- Initiate a Regional Dam Management Plan, which includes storage improvements and procedures for lowering Arlington Reservoir, Spy Pond, and Mystic Lakes ahead of storms.
- Improve sweeping and catch basin cleanout, and implement alternative and more environmentally friendly snow and ice treatment.
- Develop emergency preparedness information and outreach/network with schools, daycares, and churches, as well as retail, grocery stores, and in each business district.
- Implement a green solution at the Russell Common parking lot and other large lots along the Massachusetts Avenue corridor which will reduce radiant heat.
- Invest in and facilitate green infrastructure projects on public and private property, such as green roofs, permeable pavement, and open space, to offset dark and impermeable surfaces. Extend and replicate successful rain garden pilot projects. Work with owners of large parking lots, such as car dealerships and churches.
- Explore participating in Heat Smart Massachusetts program to make improvements to Arlington Housing Authority properties.
- Take actions to manage vectors and invasive species.

LOWEST PRIORITY

The following actions are considered low priority:

- Educate the public about issues identified by workshop participants. For example, a “Resilient Arlington” campaign can support individual preparedness by distributing best practices information and providing rain barrels. Another campaign should educate residents on stormwater pollution, how drainage systems flow to local water bodies, and actions to mitigate impacts of residential pollution sources.
- Continue water quality study at the McClellan

Park detention basin, to ensure that the former landfill remains safe from leaching.

- Develop a Community Garden Plan that identifies opportunities for expanded or additional gardens, and offer education to neighborhoods on how to maintain and develop them.
- Provide education to residents on preventing rodent infestation and expand the Town-facilitated composting program with sealed containers to separate compost from general house trash.
- Modify Town evacuation routes to account for current and future flooding, and communicate with residents about the changes.
- Prepare Ed Burns Arena to be an emergency shelter with a permanent emergency electrical generator.

NEXT STEPS

The MVP Core Group will continue to meet regularly to pursue actionable recommendations stated in this report and to develop additional pursuits as a result of the data collected in the Community Resilience Building Workshops. The Core Group will focus on high priority and policy recommendations as a first step. Acknowledging available funding through the MVP Action Grant, the Core group has identified and agreed to support the Mill Brook Corridor Flood Management Demonstration Project: Pilot Study and Implementation as its first action item.

WORKSHOP STAKEHOLDERS

The Town of Arlington wishes to thank the participants and project team for a successful workshop. The Town looks forward to collaborating on immediate and future efforts to make Arlington more resilient.

WORKSHOP PARTICIPANTS

- Board of Selectmen
- Town Manager’s Office



- Department of Planning and Community Development
- Department of Health and Human Services
- Police Department
- Department of Park and Recreation
- Department of Public Works
- Fire Department
- Arlington Redevelopment Board
- Conservation Commission
- Open Space Committee
- Disability Commission
- Facilities Department
- Capital Planning Committee
- Park and Recreation Commission
- Community Preservation Act Commission
- Sustainable Arlington
- Mothers Out Front
- Tree Committee
- Mystic River Watershed Association
- Bowes Real Estate
- Bierbrier Development
- Arlington Village Shops
- Chamber of Commerce
- Weston and Sampson
- Kleinfelder

Invited, Unable to Attend:

- Arlington Heights Merchants Association
- Inspectional Services Department
- Arlington Public Schools (Transportation)
- Housing Corporation of Arlington
- Council on Aging

- School Committee
- Historic Districts Commission
- Mill Brook Condos
- East Arlington Livable Streets
- Regenesys Group, Inc.
- MA Dept. of Conservation and Recreation
- MA Emergency Management Agency
- MA Dept. of Environmental Protection

WORKSHOP PROJECT TEAM

Department of Planning and Community Development:

- Nat Strosberg (Senior Planner)
NStrosberg@town.arlington.ma.us
- Lela Shepherd (Environmental Planner/Conservation Agent)
lshepherd@town.arlington.me.us

Core Group:

- Bob Bowes (Resident/Business Owner - Chamber of Commerce)
- Wayne Chouinard (DPW)
- Jim Curran (Police)
- Robert Jefferson (Fire)
- Ann LeRoyer (Resident - Open Space Committee)
- Gail McCormick (Resident-Mothers Out Front)
- Charlotte Milan (Recycling Coordinator)
- Brucie Moulton (Resident - Sustainable Arlington)
- Ken Pruitt (Facilities)
- Natasha Waden / Christine Buongiorno (Health)



Kleinfelder:

- Nasser Brahim (Project Manager)
nbrahim@kleinfelder.com
- Nathalie Beauvais (Principal, Facilitator)
- Betsy Frederick (Principal, Facilitator)
- Indrani Ghosh (Technical Lead, Facilitator)
- Robin Seidel (Facilitator)
- Aaron Doucett (Facilitator)
- Andrew Goldberg (Facilitator)

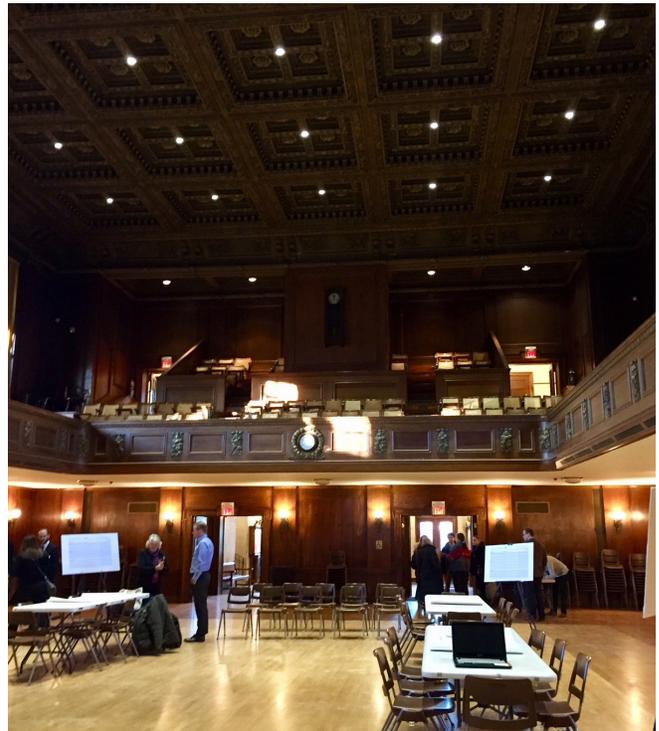
ACKNOWLEDGEMENTS

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- **Core group** members and **workshop participants** for contributing their time, passion, and ideas.

CITATION

Town of Arlington (2018) Community Resilience Building Workshop: Summary of Findings. Department of Planning and Community Development. Arlington, Massachusetts.



The Town of Arlington hosted the Community Resilience Building Workshop at Town Hall.

Photo Credit: Kleinfelder