TOWN OF READING

Community Resilience Building Workshop Summary of Findings

June 2020

Weston & Sampson

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1.0 INTRODUCTION

The Town of Reading pursued the Municipal Vulnerability Preparedness (MVP) Planning Grant to engage the community in a conversation about climate resilience. Upon reviewing the existing climate threats and the Town's proactive approach to addressing them, local stakeholders developed a list of vulnerabilities and strengths to inform the development of priority action items. The Town of Reading has since created a pathway to work collaboratively to increase climate change resilience through the MVP program. This report supplements the work of the Reading Climate Advisory Committee that developed a "Climate Change Adaptation Report" in 2014.

MVP Objectives in Reading

Increase the resilience of the community

Raise awareness of climate threats

Identify priority actions to move forward

Create implementation pathways

1.1 Infrastructure and Critical Facilities

The Town of Reading operates and maintains local connections and infrastructure to supply water and wastewater services. The Town's wastewater is treated at the regional facility at Deer Island. The Town has twelve pump stations and three have been recently rehabilitated with backup power. The remaining nine pump stations will be upgraded as part of a near- to medium-term capital planning effort. The Town's water supply is sourced from the Massachusetts Water Resource Authority (MWRA), which has more than adequate supply even under modeled drought conditions. The Town also has several back up wells that are offline near the Ipswich River. There are no permitted dams in Reading. Reading established a stormwater utility in 2006 to generate revenue to support the increasing costs of operation, maintenance, and rehabilitation.[1]

The Metropolitan Bay Transit Authority (MBTA) provides local transit services, including one commuter rail station and two bus routes. The Merrimack Valley Transit Authority also operates two regional bus routes. Reading residents have plentiful access to interstate highways. The Town is currently undergoing a Road Resurfacing and Pilot Road Diet Project on Main Street/Route 28. The Town has also completed, and is in the process of implementing, a Bicycle Network and Pedestrian Priority Plan.

The Reading Municipal Light Department (RMLD) supplies Reading and three other surrounding communities with electricity (North Reading, Wilmington, and Lynnfield). The coordination between the Town and RMLD is very strong. The RMLD, as the electric utility for Reading, has a comprehensive vegetation management plan that is revised as necessary (last updated in 2015), and proactively identifies trees to be trimmed, removed, or replaced to mitigate the risks from downed trees.[11] National Grid provides Reading with natural gas service. The emergency services and the Department of Public Works actively work with and support surrounding municipalities through mutual aid agreements for emergency response.

[1] Town of Reading. 2013. Open Space and Recreation Plan.

Municipal buildings and facilities are currently meeting the needs of the Town. However, many buildings do not have adequate back up power, including Town Hall and the Public Library. The communication infrastructure and channels to send messages to residents is well managed through online notification, Reverse 911, and local cable access. Recent upgrades to the Pleasant Street Center have improved the Town's shelter space and many residents use the Reading Public Library as a gathering space.

Figure 1. Reading Town Hall (Town of Reading Facebook)

1.2 Demographics and Community Assets

The Town of Reading is a thriving residential community. The Town provides public health and community support services to all residents, including those who may be more vulnerable during shocks such as climate hazard events. Vulnerable populations include residents at risk of isolation, such as youth or seniors who are unable to drive or those that have limited English skills. Barriers to building personal resilience, such as income, may also lead to increased vulnerability. People of color may also be more vulnerable to the impacts of climate change due to any systemic barriers. Climate resilience planning explores ways to build community networks and to increase residents' access to resources. The Town resources currently include sheltering capacity at the Senior Center, household items available through the Mission of Deeds, the food pantry, and youth and senior services. Reading's volunteer capacity is outstanding and was noted by participants through the planning process.

Approximately, 25,337 residents live in Reading (please Table 1 for more information). Based on MAPC's Stronger Region projections, the town could see a 10% population increase between 2010

and 2030.[2] Reading currently has a similar percentage of seniors, or residents over the age of 65, when compared to the State. However, the senior population over the age of 66 is projected to increase by nearly 75%, to over 2,500 residents.[3] Reading has a higher percentage of children than the State average. Reading's residents are predominately white (93%), with a small Hispanic population (3%) and Asian population (4.7%). Approximately, 2% of the population lives in a household with limited English-speaking ability. The median income ($112,634) is fairly high compared to the State, and the poverty rate is comparatively low.

Table 1. Vulnerable Population Information

Demographic Information[4]	Reading	Massachusetts
Population 2010	24,747	6,547,790
Population 2018	25,337	6,902,149
Under 18 years old	24%	20%
Over 65 years old	16%	17%
Limited English-speaking households	2%	9%
People with a disability and over 65	5%	8%
Persons in poverty	3%	10%
Median household income	$112,634	
People who are White/Caucasian American	93%	77%
People who are Asian/Asian American	5%	7%
People who are Black/ African American/ Another Race	1%	12%
People who are two or more races	1%	3%
People who are Hispanic	3%	12%

1.3 Land Use and Natural Resources

Approximately 49% of Reading is made up of forest, open space, wetlands, or agriculture.[5] Reading is also the location of two headwater streams that lead into the Aberjona (part of the Mystic River Watershed), Ipswich, and Saugus Rivers. The Town forest, adjacent to the Ipswich River, serves as an important flood barrier. Reading has no major lakes or ponds.

Incorporating resilience principles into existing economic develop strategies is a natural fit in Reading. The Town of Reading is a leader in Sustainable Development in Massachusetts. The Town was recently awarded 6th Best Complete Streets policy by Smart Growth America. Current development and redevelopment efforts are focused on four priority development areas, which in-turn can serve as key areas to build resilience. The Town regularly works with private developers to

[2]Metropolitan Area Planning Council (MAPC). 2015. Economic Development Action Plan 2016-2022. Town of Reading Planning Division.
[3] MAPC, 2015
[4] US Census Bureau. 2010. Decennial Census.; US Census Bureau. 2014-2018. American Community Survey. 5-year estimates.
[5] MAPC, 2015

consider resilience features, including making improvements to onsite stormwater management. The Town also has two historic districts in the community.

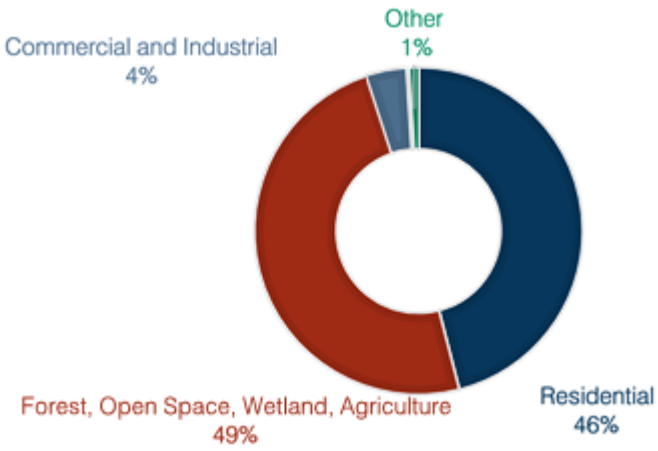


Figure 2. Reading Land Use

Priority Redevelopment Areas:

1. Downtown
2. South Main Street
3. New Crossing Road and Ash Street
4. General Way

2.0 PROCESS AND TIMELINE

The MVP planning process was informed by previous planning efforts and ongoing initiatives and operations. The planning process also updated the list of critical facilities included in the "Town of Reading Hazard Mitigation Plan Update 2017" report[6] and developed a hazard map to inform discussions on strengths and vulnerabilities (please see Appendix B). The MVP planning process engaged municipal leaders, key stakeholders, and the general public through a series of meetings described in the following sections. The 2020 "Community Resilience Building Workshop Summary of Findings" Report reflects the results of this process.

Figure 3. MVP Planning Process

2.1 Core Team Meetings

The Town convened its first Core Team meeting, which included participants from a broad range of municipal departments, on March 3, 2020. The Core Team guided the planning process by reviewing and providing feedback on the materials that would later be used at the Community Resilience Building Workshop. The Core Team provided input on the most important natural hazards in Reading, as well as existing work the Town has undertaken to adapt to climate change impacts. Core Team members are listed in Section 7.1: CRB Workshop Participants. The Core Team also developed the invitation list for the Community Resilience Building Workshop described below.

2.2 Community Resilience Building (CRB) Workshop

The objective of the Community Resilience Building (CRB) Workshop was to capture ideas from a diverse set of perspectives and to build a broad coalition of stakeholders to move climate resilience forward in Reading. Municipal staff, town boards and committees, local organizations, regional partners, state agencies and representatives, and adjacent towns were invited to participate in the CRB Workshop. Due to the public health crisis surrounding COVID-19, the CRB Workshop could not be conducted in person. As a solution, a series of three 2-hour webinars were

[6] MAPC. 2017. Hazard Mitigation Plan Update. Town of Reading.

held from May 19 to May 21, 2020. The webinars utilized the CRB Risk Matrix to facilitate discussion and record input. Each webinar focused on one of the three categories in the Risk Matrix: Infrastructure, Society, and Environment. Prior to the webinars, a survey was sent to the stakeholders to identify the top priority hazards in Reading, as well as the main infrastructural, societal, and environmental features. Approximately 25 participants were able to join each webinar. The CRB Workshop's central objectives were to:

- Identify existing and future strengths and vulnerabilities
- Develop prioritized actions for the community
- Identify immediate opportunities to collaboratively advance actions to increase resilience

The completed matrix is available in Appendix B: Community Resilience Building Workshop Materials. Additionally, a list of workshop participants is included in Section 7.1 of this report.

Figure 4. Listening Session Zoom Meeting Screenshot

2.3 Listening Session

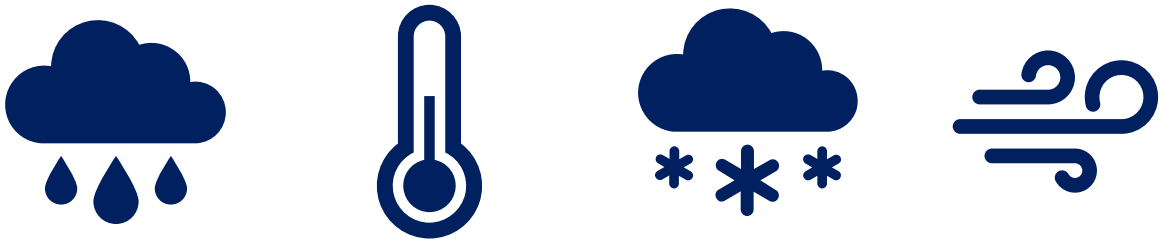
As part of the CRB process, the Town convened a public listening session on June 11, 2020. There were 16 people in attendance. To promote the event, materials were posted to the Town's webpage, a newspaper advertisement was printed, and an invitation was emailed to the stakeholder list. The listening session presented an overview of the planning process, climate impacts in Reading, and the results of the CRB Workshop. Throughout the listening session, polls were used to capture real-time feedback from attendees. Team members recorded notes and input from attendees, which were incorporated into this report. The listening session was recorded live through the Zoom video conferencing platform and a recording was posted to the Town's website. Residents could submit comments and questions through an online form between June 12th and June 19th. No comments were submitted. A summary of the meeting and interactive polling is available in Appendix C: Public Listening Session Materials.

3.0 TOP HAZARDS

During the Core Team meeting, members discussed the Town's greatest threats under climate change. The hazards initially introduced to start the conversation included intense precipitation and flooding, extreme temperatures, snow and blizzards, wind-related hazards including hurricanes and Nor'easters, drought, and fires. During the meeting, the Core Team narrowed down these extreme events to four top hazards, which were confirmed during the CRB Workshop and focused the conversation.

3.1 Top Hazards

The CRB Workshop focused on four main climate hazards: changing precipitation patterns (including intense rainfall, flash droughts, and flooding), extreme temperatures, snow and blizzards, and wind-related hazards (including nor'easters, hurricanes, and severe thunderstorms). These hazards are discussed in more detail in the following sections. In the survey sent out prior to the CRB Workshop webinars and at the public listening session, attendees indicated that intense precipitation and flooding was the hazard of most concern.



Changing Precipitation Patterns (Intense Precipitation – Flooding – Drought)

Extreme Temperatures

Snow and Blizzards

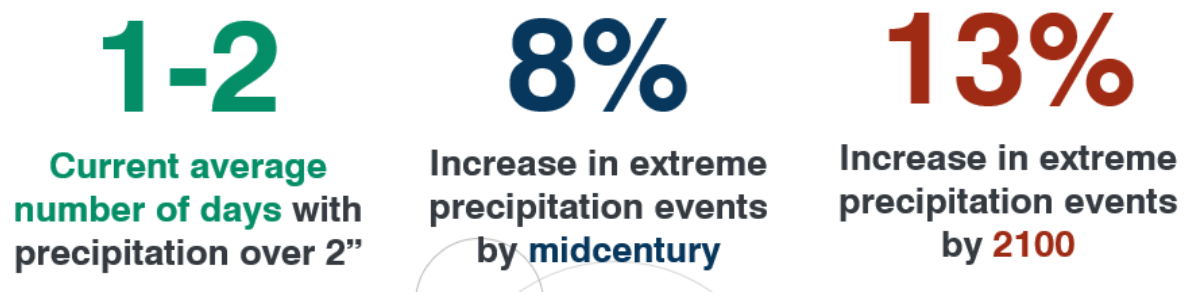
Wind-Related Hazards

3.2 Current Concerns and Future Challenges

3.2.1 Changing Precipitation Patterns

Across the northeast, precipitation during heavy events increased by more than 70% between 1958-2010.[7] This change in precipitation patterns can lead to increased riverine and stormwater flooding causing property damage, road closures, and damage to natural ecosystems. Intense rainfall events, and as a result flooding, are expected increase in frequency and volume. Currently, Reading experiences one to two days a year where it rains more than two inches, which is considered an extreme event. Climate change projections suggest there will be an 8% increase in extreme precipitation events by midcentury, and a 13% increase by 2100.[8] The Town can prepare for these precipitation trends by incorporating climate change considerations into regulatory tools and the design of public infrastructure, which often have a lengthy design life and can be difficult to retrofit.

[7] Massachusetts Executive Office of Energy & Environmental Affairs (EOEEA), "Climate Change Clearinghouse for the Commonwealth," Resilient MA, 2019, resilientma.org/.
[8] Massachusetts Executive Office of Energy & Environmental Affairs and Adaptation Advisory Committee, "Massachusetts Climate Change Adaptation Report," September 2011. P19



Stormwater flooding due to poor drainage, increased impervious surfaces, and undersized infrastructure is a growing concern. Reading's 2017 update to their Hazard Mitigation Plan identified known areas that are susceptible to flooding. High priority areas include Sunnyside and Fairview Avenues, New Crossing Road at the DPW Garage, Track Road at Line Road, South Main Street, Brook and Ash Streets, Lowell Street at Intervale Terrace, Oak Ridge/Cherry Lane, Walkers Brook Drive, Haverhill Street at the Town line, cul-de-sac at Warren Avenue, Willow Street/Austin Prep.[9] The Core Team also noted that there is flooding at the cul-de-sac at Warren Avenue.[10] In response to flooding in these areas, the Town has recently applied and received a grant to replace one of the bridges on Track Road. Reading is also working with the Mystic River Watershed Association (MyRWA) to identify areas for flood storage in the Mystic River Watershed. One of these potential flood storage areas is located by the Austin Preparatory School. This work with MyRWA may lead to an MVP Action Grant that could benefit Reading through increased funding for climate adaptation projects.[11]

Episodic droughts, or droughts lasting one to three months, are predicted to occur more frequently in the late summer and early fall as a result of climate change. Under a high emissions scenario, episodic drought frequency could increase as much as 75%.[12] Droughts can negatively impact natural resources. For example, root systems can weaken, ponds, vernal pools and wetlands can dry up, and low flows can disturb aquatic habitat and harm wildlife. Droughts also increase wildfire vulnerability, which is a primary concern in the Town Forest and the surrounding area.

3.2.2 Extreme Temperatures

Since 1970, annual air temperatures in the Northeast have been warming at an average rate of 0.5°F per decade, while winter temperatures have been warming at an average rate of 1.3°F per decade.[13]. Currently in Reading, there are 13 days on average where the temperature is above 90 °F, and this is expected to rise to 24 days annually by mid-century and 35 days annually by the end

[9] MAPC, 2017
[10] Attendees, Core Team Meeting: Reading, Massachusetts.
[11] Workshop Attendees, Community Resilience Building Workshop: Reading, Massachusetts.
[12] Massachusetts Executive Office of Energy and Environmental Affairs. 2011. Massachusetts Climate Adaptation Report. Ch. 2. https://www.mass.gov/files/documents/2017/11/29/ch%202.pdf
[13] Massachusetts Executive Office of Energy & Environmental Affairs (EOEEA), “Climate Change Clearinghouse for the Commonwealth,” Resilient MA, 2019, resilientma.org/.

of the century.[14,15] During the winter, there are currently 121 days with temperatures below 32°F, which is expected to decrease to 101 days by the end of the century.[7,8]

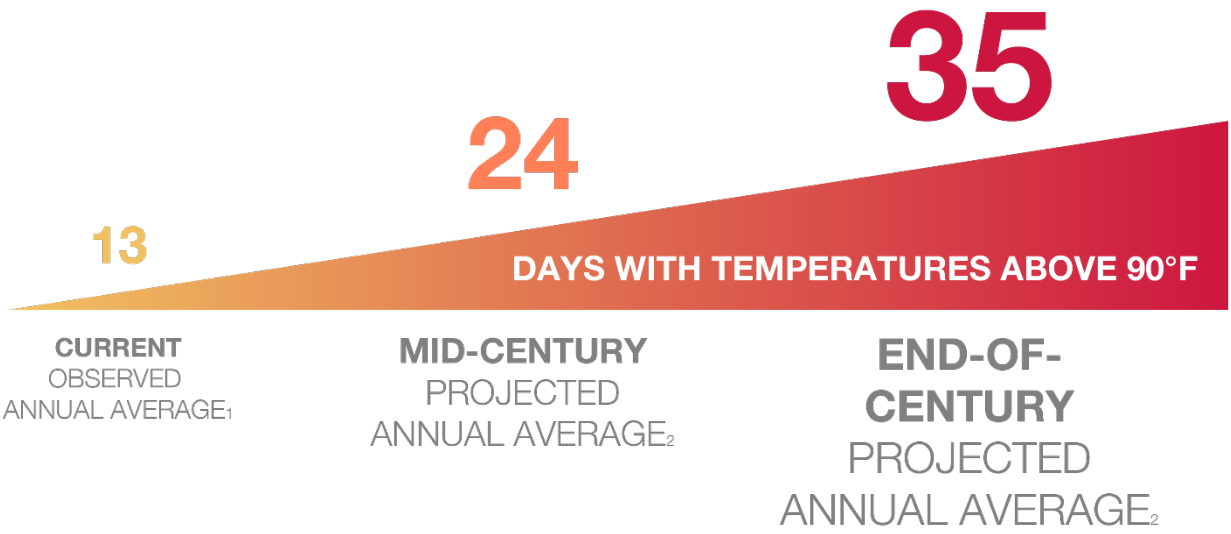


Figure 5. Days Over 90 Degrees F in Reading

Extreme temperatures in Reading put a strain on the electric grid's capacity, as these conditions lead to high demand on heating and cooling systems in both residential and commercial properties. The Reading Municipal Light Department (RMLD) is the local electric utility that serves over 29,000 customers in Reading, North Reading, Lynnfield, and Wilmington. In 2013, the Metropolitan Area Planning Council selected the RMLD and the four towns it serves to participate in a "two-year comprehensive energy planning and implementation exercise through the Local Energy Action Program (LEAP)."[16] Following the first year, the RMLD Four-Town Local Energy Action Plan was created, which provided numerous action items specific to Reading to implement clean and renewable energy solutions, reduce energy consumption, and increase outreach to residents regarding their energy usage and opportunities for efficiency. The RMLD also has an existing "Shred the Peak" campaign and two Solar Choice projects, which encourage and reward residents who limit their energy usage during peak hours.[5]

[14] National Oceanic and Atmospheric Administration. 2011. National Climatic Data Center. Protecting the Past, Revealing the Future (2020). https://www.ncdc.noaa.gov/cdo-web/datatools/lcd.
[15] Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "ResilientMA Datagrapher." Massachusetts Climate Change Clearinghouse. Resilientma.org/datagrapher/?c=Temp/state/tx90/ANN/MA/
[16] Metropolitan Area Planning Council (MAPC). 2013. RMLD Four-Town Local Energy Action Plan. I-ii

3.2.3 Snow and Blizzards

With the number of days that fall below 32°F decreasing, annual snow fall is also predicted to decrease. However, climate predictions also expect extreme snow events to become increasingly intense and produce heavier snowfall in the short-term. In the long-term, depending upon emission scenarios, winters in New England may have very little snow fall. Ice storms and repeated freeze-thaw cycles in one season are of growing concern. Ice storms that impact trees tend to be the most damaging to infrastructure. Repeated freeze-thaw cycles can also be disruptive to environmental resources and infrastructure exposed to the elements, such as roadways. Snowstorms and blizzards also have the potential to block transportation corridors in Reading, isolating residents from essential services. Power outages during winter months poses additional concerns when residents and businesses rely on electricity for heat.

Figure 6. Fallen Tree after a Winter Storm (Town of Reading Facebook)

3.2.1 Wind-Related Hazards

Wind-related hazards include hurricanes and Nor'easters, both of which have the potential to impact Reading even though their immediate tracks may not pass through Reading. North Atlantic hurricane activity has been on an upward trend since 1970.[17] Potential hurricane damages in Reading have been estimated using modeling software that determined the potential total damage for a Category 2 hurricane is $18,614.97 and $66,975.28 for a Category 4 hurricane.[18]

Nor'easters can include snow, rain, and wind impacts. Flood events are often precipitated by Nor'easters, and blizzards can also be categorized as Nor'easters. High winds from these events can lead to fallen trees and downed power lines in Reading, cutting off power to residents and critical facilities that do not have backup power. Downed trees can also block roadways, potentially impacting evacuation routes and increasing emergency management personnel response times to certain areas.

[17] U.S. Global Change Research Program (USGCRP). 2018. Climate Science Special Report, Fourth National Climate Assessment (NCA4).
[18] MAPC, 2017

4.0 VULNERABILITIES

The workshop participants' major area of concern was from intense precipitation and flooding. The need for infrastructure upgrades at critical facilities, improving mobility for residents, and protection of environmental assets from erosion and flooding were highlighted during discussions. Specific areas of concern were grouped within the following three categories: infrastructural, societal, and environmental.

4.1 Infrastructure

Workshop participants identified key infrastructural features in Reading that are most vulnerable to natural hazards and climate change impacts or may be so in the future. These features include:

- Snowstorms and high wind can lead to downed power lines and unavailable power
- Extreme temperatures can lead to override of power system capacity
- Water distribution system is aging
- Flooding of roadways, especially Willow St, Walkers Brook Drive, and Main Street (Route 28)
- Aging wastewater pump stations that do not have backup power
- Natural gas leaks
- Culverts are undersized and made of poor, outdated materials
- Drinking water booster pumps are at risk of flooding
- Low impact development (LID) in private developments is not always properly maintained
- Road access if flooded, blocked, or washed out, especially on dead-ends and cul-de-sacs

Figure 7. Downed Power Lines (RMLD, Twitter)

4.2 Societal

Workshop participants discussed the impact of climate change to vulnerable populations and essential services, which included:

- Emergency communication system is at risk during power outages
- Town Hall and Reading Public Library do not have backup generators
- Main Street is not walkable outside of the downtown area and has heavy traffic traveling at high speeds
- Access to municipal and essential services and the need for more transit; there are only two (136 and 137) bus routes in Town, lacking in east-west connections
- Most communication relies on electricity and a stable internet connection
- Senior Center and municipal building closures due to COVID-19 suggest that responding to hazard events would look very different during a public health crisis
- Flooding of residential basements
- Financial barriers to building personal resilience
- Little is known about the vulnerability of historic structures
- Ability of older homes to support additional snow loads
- Business closures and economic loss during hazard events
- Heat waves and hot classrooms

4.3 Environmental

Workshop participants identified key environmental features in Reading that are most vulnerable to natural hazards and climate change impacts. These features include:

- Erosion and sedimentation causing flooding and property damage in various areas, including Walkers Brook, Starbucks on Main Street, Main Street and Cross Street, Pine Vale, and Track Road
- Need to consider the impact of additional flood storage on raising the groundwater table and causing potential basement flooding
- Availability of land is limited and easements can present issues
- Planned unit development zoning can be underutilized
- Trees often fall and wipe out infrastructure; weaker species include Norway Maples, old pines, Bradford Pear
- Droughts and invasive species, including the Emerald Ash Borer, present emerging risks to trees

5.0 CURRENT STRENGTHS AND ASSETS

Many workshop participants felt that Reading's greatest assets include departments that collaborate to provide services to residents, including the Town's most vulnerable populations. Reading's infrastructure, including its water supply through the Massachusetts Water Resource Authority (MWRA), and environmental assets also contribute to the Town's ability to successfully weather shocks that include intense precipitation and flooding.

5.1 Infrastructure

Workshop participants identified key infrastructural features in Reading that provide strength against natural hazards and climate change impacts. These features include:

- MWRA water supply
- RMLD provides service as a local utility and has quick response times
- Two Solar Choice projects
- Town is exploring pedestrian friendly alternatives to roadways (Road Diet Trials, etc.)
- Emergency Management Plan for cooling centers and energy efficiency upgrades
- Capital plan to upgrade all municipal wastewater pump stations
- Wastewater system evaluation in economic development areas
- Infiltration and Inflow
- Stormwater Enterprise Fund
- Private development is encouraged to include LID
- Small bridge replacements and upgrades. The Track Road bridge replacement is underway
- Regional collaborations and mutual aid agreements

5.2 Societal

Workshop participants identified key societal aspects of Reading that provide strength against natural hazards and climate change impacts. These aspects include:

- Collaboration between Public Health, Schools, Elder & Human Services and Public Safety departments. This includes maintaining a database of vulnerable residents, and providing advocates, food pantry, and van service.
- Senior Center is a cooling center and has temporary cots and a backup generator
- Outreach and events for elderly and vulnerable community members
- Downtown District Management Organization and Reimagine Reading
- Smart Growth zoning plan for downtown
- Private developments are encouraged to provide shuttle bus services
- Town has a bike plan assessing options to improve bike infrastructure
- Historic sites and the possibility of establishing a cultural district
- French drains were installed in Willow Street to reduce impact to homes during flood events
- Great emergency communication services
- Library for a gathering place and information resource
- Non-profits services such as the Mission of Deeds and food pantry

5.3 Environmental

Workshop participants identified key environmental features in Reading that provide strength against natural hazards and climate change impacts. These features include:

- Parks, which provide a buffer to flooding
- Wetlands are well preserved through enforcement of the Wetlands Bylaw
- Stormwater regulations have been recently updated
- Forest management pilot project
- Private developments are given design standards and go through many reviews
- Shared driveways on large parcels
- Coordination between developers and the Town to improve stormwater management, flood storage, and the treatment of runoff on-site
- Stormwater regulations were recently updated to increase stormwater infiltration and encourage creative open space
- Recent bank stabilization at Sturgis Park
- Shade trees in recreational areas

Figure 8. Kurchian Woods (Town of Reading, Facebook)

6.0 TOP RECOMMENDATIONS TO IMPROVE RESILIENCE

After discussing impacts of the Town's top hazards and listing vulnerability and strengths, workshop participants brainstormed possible actions to address climate change impacts. Participants were given the option to rank action items as a low, medium, or high priority. No action items were designated as a low priority. In some cases, the actions were prioritized as moderate because they are ongoing processes that the town is already working on. In other cases, the prioritization was informed by cost, technical and political feasibility, and community benefit. A summary of findings is included below.

6.1 High Priorities

- Electric Grid
  - Educate residents about energy conservation and off-peak energy usage
  - Leverage rebate and incentive programs to promote renewable energy and energy efficiency
  - Identify critical facilities in Town and if they have a backup generator
  - Invest in solar carports and/or solar roofs at critical facilities
- Roadways
  - Design and construct flood storage and stormwater infiltration projects, such as those identified by the Mystic River Watershed Association (MyRWA)
  - Develop a planting guide that promotes diversity and species that could be planted along roadways and near power lines to reduce power outages from downed limbs
  - Update bridges at Track Road at Line Road
- Stormwater System
  - Incorporate green infrastructure, shade trees and other resilience features into economic development zones
  - Update development and redevelopment regulations to require stormwater systems to consider climate projected design storms
  - Update culverts (including at Haverhill Street and New Crossing at DPW Garage) and municipally owned stormwater infrastructure (including undersized pipes at Sunnyside and Fairview Avenue, and at South Main Street) using climate projections, and include co-benefits such as wildlife habitat and passage
  - Pilot Low Impact Development (LID) designs to retrofit existing catch basins.
  - Address ongoing drainage issues at Oak Ridge/Cherry Lane, Willow Street and Austin Prep, and Lowell Street at Intervale Terrace)
  - Re-paint "Do Not Dump" on storm drains
  - Develop training and funding to support LID and green infrastructure maintenance
- Water Supply & Wastewater Treatment and Collection
  - Elevate or protect drinking water booster stations from flooding
  - Upgrade wastewater pump stations and add backup power
- Emergency Communications
  - Develop backup communication strategies for when power outages occur and the internet is not accessible
  - Explore opportunities for solar power and battery backup at critical facilities

- Mobility
  - Explore ability to increase number of vans for Senior Center van service
  - Develop a dedicated area for drop-off from rideshares
  - Explore opportunities to join local ridesharing groups
  - Improve bike lane network through the development of the Town's bike plan
  - Improve access to downtown through buses, shuttle systems, and bike lanes
  - Expand downtown Smart Growth zoning to other areas of Town to improve connectivity
- Risk of Isolation
  - Expand database of residents
  - Develop a plan for extreme heat during COVID-19
  - Look for opportunities surrounding a new Senior Center with climate resilient features and capacity to function as a cooling center
  - Explore opportunities for public-private partnerships (PPP) to provide additional heating and cooling stations
- Downtown District, Local Businesses, Economic Development Zones
  - Support local businesses through access to funding (including small business loans) to improve resilience
  - Cultivate a vibrant downtown activity culture for young families
  - Incentivize resilient and sustainable development in economic development zones
- Rivers and Streams
  - Implement stream stabilization and restoration in areas of erosion. Consider natural stream-based restoration over hardscape in-stream stabilization
  - Address sedimentation at Pinevale Conservation Area near Warren Avenue drainage outfall, which may interfere with sewer main
  - Increase nature-based stormwater to reduce inflow during large storms
  - Identify areas for strategic land acquisition
  - Explore options for using Town-owned land for infiltration and storage (Birch Meadow, Burbank Ice Arena, Imagination Station and near fields)
  - Remove invasive species along stream bank near Imagination Station
- Street Trees/Tree Canopy
  - Research tree box filters that allow for better tree growth
  - Replant and add shade trees with diverse species at Memorial Park
  - Create a map of street trees to help manage ash tree removal and replanting, possibly start with Harrison Avenue
  - Replant small trees under utility wires
  - Look for guidance on how planting will flourish in the long run and will impact the built environment
  - Identify locations where gas leaks are impacting trees and remediate the impact
  - Plant trees in urban heat island areas, such as the parking areas near the MBTA Commuter Rail station and on Walkers Brook Drive
  - Based on the results of the forest management pilot project, expand and adapt to other areas

- Bylaws, Regulations, and Planning
  - Increase climate resilience standards for new development and redevelopment
  - Increase the buffer zone in the Wetlands Bylaw and investigate opportunities for purchasing some of the buffer zone
  - Update the floodplain overlay district to consider climate projections
  - Incorporate climate resilience into plan implementation and updates (including the Master Plan, Open Space Plan, and Hazard Mitigation Plan)

6.2 Moderate Priorities

- Water Supply
  - Continue to promote the water conservation program and build redundancy in supply system
  - Replace old cast iron water mains to decrease the risk of water main breaks
- Municipal Buildings and Services
  - Resurface black tar roofs of schools and municipal buildings with reflective material
  - Conduct a vulnerability study of municipal buildings
- Wastewater Treatment and Collection
  - Continue work on the wastewater infiltration and inflow program and ensure the designs will meet future capacity
- Natural Gas
  - Develop stronger communication with National Grid on emergency operations
- Barriers to Personal Resilience
  - Develop educational programs for residents to inform how they can be resilient and prevent them from becoming overwhelmed
  - Promote existing counselling services and public health resources
  - Find other channels besides website/online to distribute information
- Parks and Forests
  - Incorporate climate change into recreational facilities and parks planning and design
  - Expand forest management and complete the forest management plan
  - Prioritize areas for green infrastructure, like the field house parking lot and Birch Meadow
  - Implement protection for tree roots in parking areas
  - Work to remove ash trees on Harrison Avenue
- Development Patterns
  - Remove requirement to go to Town meeting for Planning Unit Developments
  - Promote higher density development near the MBTA Commuter Rail and in already developed areas
  - Encourage cluster development to allow for more open space
  - Build a consensus around Smart Growth zoning using information about cost and co-benefits of Smart Growth development
  - Ask developments to put sensitive areas and wetlands into conservation deeds and connect them to existing forests and natural areas
  - Update the subdivision regulations to promote more low-impact development

- Historic and Cultural Sites
    - Perform an assessment of historic and cultural sites and structures to understand their vulnerabilities to flooding, snow, wind, and other hazards
- Emergency Communications
    - Study the feasibility of a municipal broadband network to improve internet connection

7.0 ADDITIONAL INFORMATION

7.1 CRB Workshop Participants

The CRB Workshop participants included the Core Team, Town staff, Town Boards and Committees, local organizations, and regional partners. Representatives from adjacent communities were invited but were unable to attend. The full list of CRB Workshop invites is included in the sections below.

7.1.1 Core Team

Name	Title	Affiliation	Attendance
Jean Delios	Assistant Town Manager	Town of Reading	x
Chuck Tirone	Conservation Administrator	Conservation Division	x
Ryan Percival	Town Engineer	Town of Reading – Public Works- Engineering Division	x
Jane Kinsella	DPW Director	Town of Reading – Public Works	x
Christopher Cole	Assistant DPW Director	Town of Reading – Public Works	x
Julie Mercier	Community Development Director	Planning and Community Development	x
Andrew MacNichol	Staff Planner	Planning and Community Development	x
Erin Schaeffer	Economic Development Director	Planning and Community Development	x
Robert LeLacheur	Town Manager	Town of Reading	

7.1.2 Additional Town Staff, Boards, Committees, Local Organizations

Name	Title	Affiliation	Attendance
Alex Rozycki	Senior Civil Engineer	Town of Reading – Public Works – Engineering Division	x
Sharon Angstrom	Director	Finance	x
Kevin Furilla		IT	x
Annika Scanlon	Member	Conservation Commission	x
Mike Flynn	Member	Conservation Commission	x
Martha Moore	Member	Conservation Commission	x
David Zeek	Member	Climate Action Committee	x
Travis Estes	Member	Climate Action Committee	x
Nancy Twomey	Member	Permanent Building Committee	x
Hamid Jaffari		Reading Municipal Light District	x
Jamie Maughan	Member	Zoning Board of Appeals	x
Hillary Mateev	Member	Zoning Board of Appeals	x

Name	Title	Affiliation	Attendance
Tony D'Arezzo	Member	Community Planning and Development Commission	x
Paul Jackson	Assistant Chief of Fire	Fire Department	x
Virginia Adams	Member	Reading Historical Commission	x
Peter MacGown	Member	Climate Advisory Committee	x
Janet Walsh		RMLD	x
David Clark	Chief of Police	Police Department	
Mike Scouten	Safety Office	Police Department	
Christine Amendola	Lieutenant	Police Department	
Greg Burns	Chief of Fire	Fire Department	
Kevin Bohmiller	Representative	Veterans Services/Elder Services	
Laura Vlasuk		Public Health Services	
Mark Dupell	Building Commissioner	Building Department	
Mike Hannaford		Parks and Forestry Division	
Joe Huggins	Director	Facilities	
George Strazzere		Highway Division & Stormwater Division	
Genevieve Fiorente	Recreation Administrator	Recreation Division	x
Peter Isbell		Sewer Division & Water Division	
Jonathan Barnes	Chair	Reading Historical Committee	
Coleen O'Brien		Reading Municipal Light District	
Laurie Stanton	Housing Coordinator	Metro North Regional Housing Services Office	
John Weston	Chair	Community Planning and Development Commission	
Heather Clish	Member	Community Planning and Development Commission	x
Ray Porter		CAC	
Vanessa Alvarado	Chair	Select Board	
Emmy Dove		Board of Health	
Cy Caouette	Chair	Zoning Board of Appeals	
Emily Sisson	Chair	Recreation Committee	
Will Finch	Member	Trails Committee	
Bill Sullivan	Member	Forest Committee	
Jean Jacobs	Member	Forest Committee	
Mary-Ann Higgins	Member	Reading Garden Club	
Jean Maloney-Stewart	Member	Reading Garden Club	

Name	Title	Affiliation	Attendance
John Fuedo	Executive Director	YMCA	
Eileen Barret		Reading Public Library	
Jim Hickey	Headmaster	Austin Prep	

7.1.3 Adjacent Communities

Name	Title	Affiliation	Attendance
Danielle McKnight	Planning Director	Town of North Reading	
Emily C		Town of Lynnfield	
Paul Revis	Town Planner	Town of Wakefield	
Erin Wortman	Director of Planning & Community Development	Town of Stoneham	
Jay Corey	City Engineer	Town of Woburn	
Valerie Gingrich	Director of Planning & Conservation	Town of Wilmington	

7.1.4 Regional and State Agencies

Name	Title	Affiliation	Attendance
Alex Koppelman	Member	MAPC	x
Ed Markey	Federal Senator	US Senate	
Elizabeth Warren	Federal Senator	US Senate	
Seth Moulton	Federal Representative	US House of Representatives	
Jason Lewis	State Senator	Massachusetts Senate	
Richard Haggerty	State Representative	Massachusetts House of Representatives	
Brad Jones	State Representative	Massachusetts House of Representatives	
Terrence Kennedy	Governor's Councilor	Commonwealth of Massachusetts	
Julie Wormser	Deputy Director	Mystic River Watershed Association	
Michelle Rowden	Regional Coordinator	MVP Program	
Jeffrey Zukowski	Hazard Mitigation Planner	MEMA	

7.2 Citation

Town of Reading. (2020). Community Resilience Building Workshop Summary of Findings. Prepared by Weston & Sampson.

7.3 CRB Workshop Project Team

Key Staff:

- Andrew MacNichol, Staff Planner, Town of Reading
- Julie Mercier, Community Development Director, Town of Reading
- Core Team Members as noted above

Facilitators from Weston & Sampson:

- Amanda Kohn
- Steve Roy
- Cassandra Albrecht

7.4 Acknowledgements

The project team would like to recognize Reading's Core Team members for leading by example throughout the MVP planning process. The team would also like to acknowledge Andrew MacNichol and Julie Mercier for their dedication to spearheading and coordinating this project. A special thanks to the Massachusetts Executive Office of Energy and Environmental Affairs for providing the grant funding to conduct the MVP Planning process, and to the Nature Conservancy for providing the Community Resilience Building Guidebook. An additional thanks to all of the CRB Workshop and Listening Session participants, and to the Project Team for facilitating successful events.

REFERENCES

Attendees, Core Team Meeting: Reading, Massachusetts.

Massachusetts Executive Office of Energy & Environmental Affairs and Adaptation Advisory Committee, "Massachusetts Climate Change Adaptation Report," September 2011. P19

Massachusetts Executive Office of Energy and Environmental Affairs. 2011. Massachusetts Climate Adaptation Report. Ch. 2. https://www.mass.gov/files/documents/2017/11/29/ch%202.pdf

Massachusetts Executive Office of Energy & Environmental Affairs (EOEEA), "Climate Change Clearinghouse for the Commonwealth," Resilient MA, 2019, resilientma.org/.

MassGIS. Statewide Base Layers.

Metropolitan Area Planning Council (MAPC). 2013. RMLD Four-Town Local Energy Action Plan.

Metropolitan Area Planning Council (MAPC). 2015. Economic Development Action Plan 2016-2022. Town of Reading Planning Division.

Metropolitan Area Planning Council (MAPC). 2017. Hazard Mitigation Plan Update. Town of Reading.

National Oceanic and Atmospheric Administration. 2011. National Climatic Data Center. Protecting the Past, Revealing the Future (2020). https://www.ncdc.noaa.gov/cdo-web/datatools/lcd.

Town of Reading. 2013. Open Space and Recreation Plan.

Town of Reading. Community Emergency Response Plan Critical Facilities List.

US Census Bureau. 2010. Decennial Census.

US Census Bureau. 2014-2018. American Community Survey. 5-year estimates.

US Federal Emergency Management Agency. 2010. Flood Insurance Rate Map. FEMA Flood Map Service Center

U.S. Global Change Research Program (USGCRP). 2018. Climate Science Special Report, Fourth National Climate Assessment (NCA4).

Workshop and Listening Session Attendees. Reading, Massachusetts.

APPENDIX A

Core Team Meeting Materials

TOWN OF READING

Municipal Vulnerability Preparedness Planning Grant Project

Core Team Meeting Agenda

Town Hall's Berger Room
Tuesday, March 3rd, 2020
11:00 am – 12:15 pm

Introductions — 5 minutes

- Steve Roy and Amanda Kohn attended from Weston & Sampson
- Core Team attended from the Town of Reading, see sign-in sheet

Project Overview — 5 minutes

1. MVP Program Overview
    a. MVP Planning Process
    b. MVP Action Grants
        i. No minimum on grant ask
        ii. Maximum of $5 million with regional project, $2 million on local projects
        iii. Match
            1. Private foundations, stormwater utility, ongoing efforts
        iv. No limit on the number of applications that can be submitted
2. Community Resilience Building Workshop
    a. March 31st, 9-5 at the Library – an invitation to follow
    b. Listening Session Potential Dates:
        i. Tuesday, April 21st in the evening
        ii. Ongoing event in conjunction with Earth Day
        iii. April 7th – New Resident Open House
        iv. Tuesday, May 12th in the evening
        v. Ongoing meetings (ConCom, Planning Board)
    c. Draft Plan to Town for Review – May 26th (week for review)
        i. Might be able to go earlier, which would allow time to post the draft plan online
        ii. Will look to move the Listening Session up to Tuesday 4/21 evening
        iii.
    d. Draft Plan due to the state on June 15th

Core Team Role — 5 minutes

1. Core Team Role
    a. Develop/approve list of stakeholders
    b. Provide input to the critical facilities list
    c. Active participants in the Community Resilience Building Workshop
    d. Promote the listening session/attend listening session
    e. Inform community priorities/Determine how decisions from Workshop will be used

Climate Change in Reading — 15 minutes

1. Some of the graphics feel old and need updated with new data/fresh look. **Will work to find some recent Reading specific climate data (i.e how many days over 90 degrees in the past five years, extreme precipitation events in the last 5 years)**
2. Change grey text to a darker color
3. Add snow coverage graphic
4. Remove specific date on Pleasantries flyer
5. 2008 ice storm – lost lots of power
6. Snow is less prevalent, but when we have it, it uses a lot of our capacity and budget (snow in Dec this year is an example)
7. Tree damage during wind – impacts to private property
8. Change text to Fairchild Drive
9. Add impacts of inland flooding near sea level rise and add impact images of flooding
10. Drought does not impact water supply, but does impact recreation and low flows in the rivers
11. look for some regional impacts surrounding commutes and transit- MBTA Commuter Rail
12. Correct spelling on Willow Street – not Will street

Community Resilience Building Workshop Materials — 25 minutes

1. Top 4 hazards would include Increased Precipitation/Flooding, Snow Fall and Blizzards, Wind and Extreme Temperatures
2. Review list of critical facilities
    a. Public health department has information on food establishments and gas stations
    b. RMLD serves four communities and they have a "Shred the Peak" campaign on social media, but they specifically target commercial properties
    c. new area of flooding that should be mapped/captured: "A new area to look at would be the cul-de-sac at Warren Avenue. This is the discharge point to a massive storm drain watershed that runs through Pinevale Conservation area. Solids settle out in the first 200 feet of the open channel to a point where the sediment is a few inches below the sewer main that crosses the perennial stream. The sewer crossing wasn't designed for lateral pressure from the stream current or sediment Piling up around it, this could end badly. This could be an area needing MVP attention. 50 years' worth of sediment from the street needs to be removed and the stream bank stabilized all in an effort to protect the sewer main that crosses above the stream in this area."
    d. Light Department serves 4 communities and operates to reduce peaks when necessary for major users
    e. MWRA is water supply
3. Plans and data to review
    a. Economic Development Action Plan – online
    b. Need copies of
        i. Aberjona River and Saugus River Drainage Study Summary Report (2013)
        ii. Vegetation management plan
        iii. Capital Improvement Plan
        iv. Comprehensive Emergency Management Plan
        v. Progress made with stormwater utility funding
        vi. Local GIS Data, Fire Dept data, etc.
4. Local interests
    a. Recycling has been a big topic of discussion and may come up during this process

   b. YMCA is big focal point in community and should be involved
   c. Commuters and regional focus and flavor needs to be added into powerpoint
5. Recent work on flooding
   a. Bridge @ Track Rd as part of small bridge grant
   b. Willow Street and Austin Prep is the area with the most flooding- road closures
   c. Ditch clean-up as part of mosquito control district near Austin Prep
   d. Beaver management at New Crossing and Track Road
6. Ongoing projects:
   a. Regional Committees with surrounding municipalities, EPA, DER, and Mystic River Watershed Association
   b. Pilot project in Town Forest
   c. Water restriction every summer

Workshop Participants — 15 minutes

- Mystic River Watershed Association
- Various collaborations across municipal boundaries and with agencies
- YMCA
- RMLD

Wrap Up and Next Steps — 5 minutes

1. W&S will support quarterly report for March
2. Core Team will send feedback to Andrew on stakeholder list and critical facilities list
3. Complete stakeholder list and workshop invitations the week of March 9th

Sign In Sheet – Development Review Team (DRT) Meeting

Project Name: MVP Kick-Off Meeting w/ Weston and Sampson Date: 3/3/20

Name	Title	Representative	Email address	Telephone
Bob LeLacheur	Town Manager	Town of Reading	blelacheur@ci.reading.ma.us	781-942-6643
Jean Delios	Assistant Town Manager	Town of Reading	jdelios@ci.reading.ma.us	781-942-6612
Greg Burns	Fire Chief	Town of Reading	gburns@ci.reading.ma.us	781-944-6730
Paul Jackson	Assistant Fire Chief	Town of Reading	pjackson@ci.reading.ma.us	781-944-6732
Rick Nelson	Fire Captain	Town of Reading	rnelson@ci.reading.ma.us	781-942-6733
Ryan Percival	Town Engineer	Town of Reading	rpercival@ci.reading.ma.us	781-942-6690
Alex Rozycki	Civil Engineer	Town of Reading	arozycki@ci.reading.ma.us	781-942-6684
Daniel Markman	Health Inspector	Town of Reading	dmarkman@ci.reading.ma.us	781-942-6610
Chuck Tirone	Conservation Admin.	Town of Reading	ctirone@ci.reading.ma.us	781-942-6616
Jane Kinsella	Public Works Director	Town of Reading	jkinsella@ci.reading.ma.us	781-942-9700
Chris Cole	Assist. Public Works Dir.	Town of Reading	ccole@ci.reading.ma.us	781-942-9082
Michael Scouten	Public Safety Officer	Town of Reading	mscouten@ci.reading.ma.us	781-942-6775
David Clark	Deputy Police Chief	Town of Reading	dclark@ci.reading.ma.us	
Kristen O'Shaughnessy	Community Support Off.	Town of Reading	koshaughnessy@ci.reading.ma.us	
Christine Amendola	Police Department	Town of Reading	camendola@ci.reading.ma.us	
Mike Hannaford	Tree Warden	Town of Reading	mhannaford@ci.reading.ma.us	
Brian Smith	RMLD Engineer	RMLD	bsmith@rmld.com	781-942-6435
Laura Vlasuk	Health Agent	Town of Reading	lvlasuk@ci.reading.ma.us	781-942-6653
Laurie Stanton	Housing Coordinator	Town of Reading	lstanton@ci.reading.ma.us	781-942-6667
Andrew MacNichol	Staff Planner	Town of Reading	amacnichol@ci.reading.ma.us	781-942-6674
Julie Mercier	Community Development Director	Town of Reading	jmercier@ci.reading.ma.us	781-942-6652
Mark Dupell	Building Commissioner	Town of Reading	mdupell@ci.reading.ma.us	781-942-6609
Erin Schaeffer	Economic Development Director	Town of Reading	eschaeffer@ci.reading.ma.us	781-942-6791
Alex				

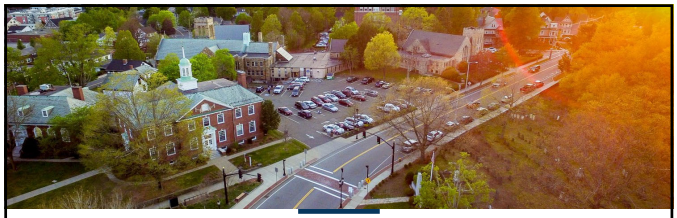
Municipal Vulnerability Preparedness Planning Grant Project
Tuesday, March 3, 2020 11:00 am – 12:15 pm

Name	Present- Mark with X or Sign
Robert LeLacheur	
Jean Delions	
Erin Schaeffer	
Chuck Tirone	
Ryan Percival	
Jane Kinsella	
Chris Cole	
Julie Mercier	
Andrew MacNichol	
Alex Rozycki	
Michael Scanlon	
Paul D. Jackson	

Weston & Sampson

APPENDIX B

Community Resilience Building Workshop Materials



TOWN OF READING

Municipal Vulnerability
Preparedness (MVP) Program

Massachusetts Executive Office of Energy and Environmental Affairs

Photo: Town of Reading Twitter

1

OUTLINE

PRESENTATION:

- Overview of the MVP
- Climate Change Impacts
- Next Steps

Photo: Reading Facebook

2

MVP PROGRAM PRINCIPALS

3

MVP COMPONENTS

PHASE 1 - PLANNING

- Receive Planning Grant
- Engage the Community
- Assess Vulnerabilities and Strengths
- Prioritize Action Items
- Submit Final Report for Approval
- Become Certified

PHASE 2 - ACTION

- Select an Action Item from Planning Phase
- Apply for Action Grant Funding
- Up to $2 million for planning, design, permitting, construction
- 25% grant match in cash or in-kind
- $10-15 million available

4

PROJECT OVERVIEW

1. Review Plans
2. Convene the Core Team → Met earlier this year
3. Critical Facilities List → Sent in pre-workshop materials
4. Hazards Map
5. Community Resilience Building Workshop → 3 webinars
6. Finalize Priorities
7. Public Listening Session → Online live and recorded
8. Report → Due to EEA on June 30th

5

MVP ACTION GRANTS PROJECT TYPES

- **Vulnerability and Risk Assessment**
  - Community Outreach and Education
  - Local Bylaws, Ordinances, Plans, and Other Management Measures
  - Mosquito Control Districts
- **Redesigns and Retrofits**
  - Subsidized Low-Income Housing Resilience Strategies
  - Chemical Safety
  - Energy Resilience
- **Nature-Based Solutions**
  - Land Acquisition for Resilience
  - Ecological Restoration and Habitat Management to Increase Resiliency
  - Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques
  - Infrastructure and Technology to Extreme Heat and Poor Air Quality
  - Reduce Vulnerability to other Climate Hazards

6

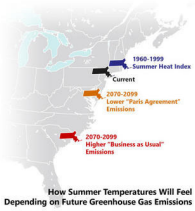
MASSACHUSETTS GHG GOALS

Global Warming Solutions Act (GWSA) of 2008

25% reduction in GHG emissions by 2020

80% reduction in GHG emissions by 2050

1990 is the baseline year



How Summer Temperatures Will Feel Depending on Future Greenhouse Gas Emissions

Source: Commonwealth of Massachusetts. 2019. "Global Warming Solutions Act 10-year Progress Report." 10.

7

7

CLIMATE HAZARDS IN READING

Extreme Precipitation and Flooding

Severe Thunderstorms and Snowstorms

Hurricanes, Nor'easters, High Wind

Extreme Temperatures

Drought

Fires

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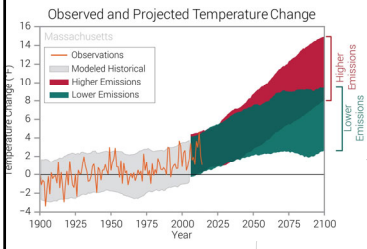
EXTREME TEMPERATURES



Since 1970, annual temperatures in the Northeast have been warming at an average rate of 0.5°F per decade

Source: ResilientMA.org. "Rising Temperatures," 2017.

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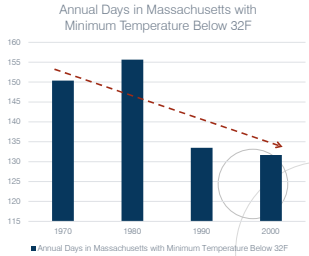
EXTREME TEMPERATURES



Winter temperatures have been warming at an average rate of 1.3°F per decade

Source: ResilientMA.org. "Rising Temperatures," 2017.

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EXTREME TEMPERATURES IN READING, MA

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EXTREME TEMPERATURES IN READING, MA

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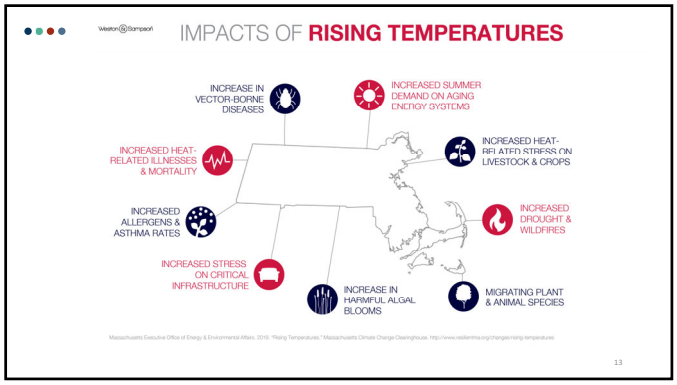

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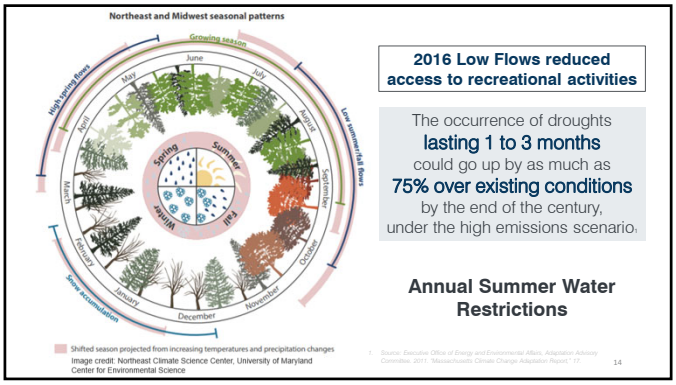

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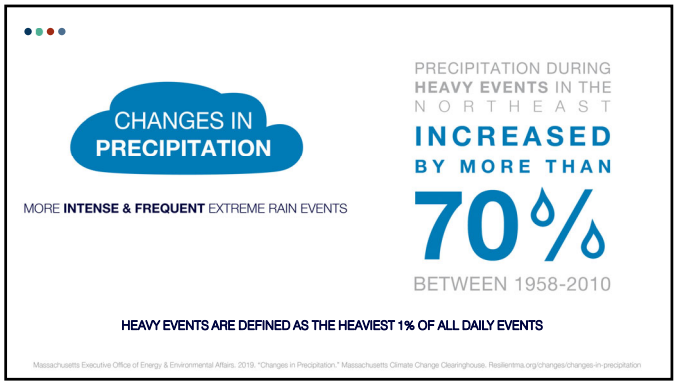

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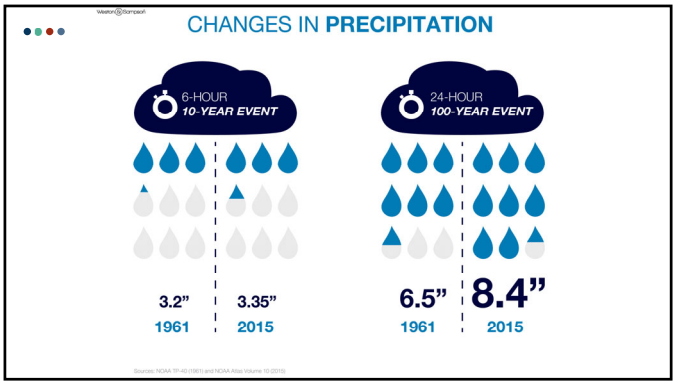

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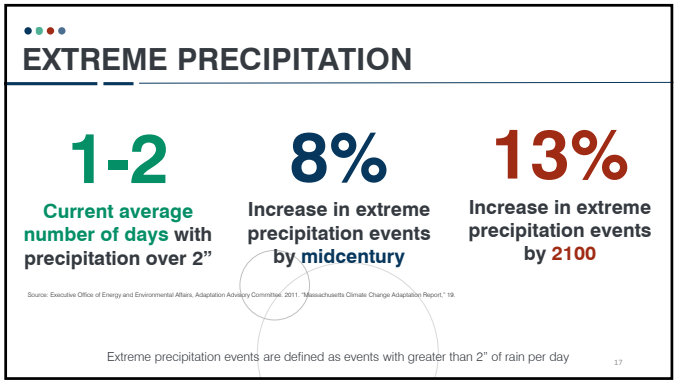

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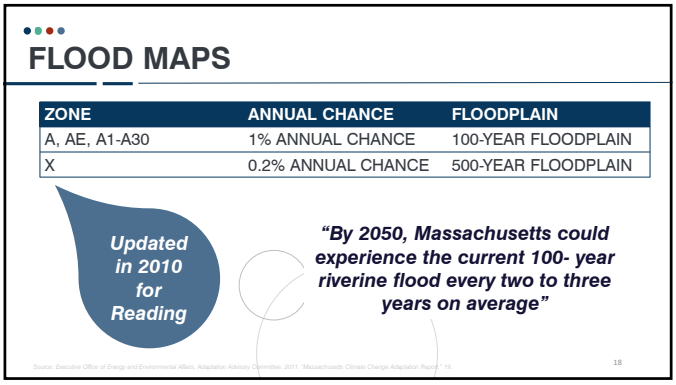

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STORMWATER FLOODING

Areas with:
- Poor drainage
- High amounts of impervious surface
- Undersized culverts

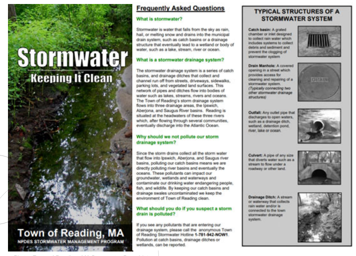

Photo: Town of Reading, MA Stormwater Pamphlet

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AREAS OF FLOODING

- Southern part of town, generally small in scale and clustered
- 2 repetitive loss sites
- Sunnyside and Fairview Avenues – undersized pipes
- New Crossing at DPW Garage – undersized culvert
- Track Road at Line Road – 3 bridges that impede flow, location of beaver blockage
- South Main Street – storm drain line needs to be replaced
- Brook and Ash Streets – drainage ditch issues and beaver blockages
- Lowell Street at Intervale Terrace – drainage issue
- Willow Street/Austin Prep – drainage issue
- Oak Ridge/Cherry Lane – drainage issue
- Haverhill Street at the Town line – undersized culvert
- Cul-de-sac at Warren Avenue

Reading Hazard Mitigation Plan. 2017. and Core Team Input

20

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1. *Resilient MA Climate Change Clearinghouse for the Commonwealth. "Extreme Weather," 2017*
2. *"Massachusetts State Hazard Mitigation and Adaptation Plan." 2018. P4-226).*
3. *Climate Central, 2020*

Photo: Town of Reading, MA Facebook

WINTER STORMS

- The blizzard of 2013 left nearly 400,000 Massachusetts residents without power[1]
- "Heavy blizzards are among the most costly and disruptive weather events for Massachusetts communities."[2]
- Snowpack likely to decrease in the long-term, but snowfall may increase in the short- to medium-term because warmer air holds more moisture[3]

Transit (MBTA) closure power outages
restricted roadway access
school closure
ban on-street parking

21

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2008 ice storm caused major power outages

Photo: Town of Reading, MA Facebook

22

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As an FYI: Boston Sea Level Rise Projections (ft)

Increased coastal flooding

Permanently inundated low-lying coastal areas

Increased shoreline erosion

Emission Scenario	2030	2050	2070	2100
Intermediate	0.7	1.4	2.3	4.0
Intermediate-High	0.8	1.7	2.9	5.0
High	1.2	2.4	4.2	7.6
Extreme	1.4	3.1	5.4	10.2

(Source: Northeast Climate Adaption Science Center)

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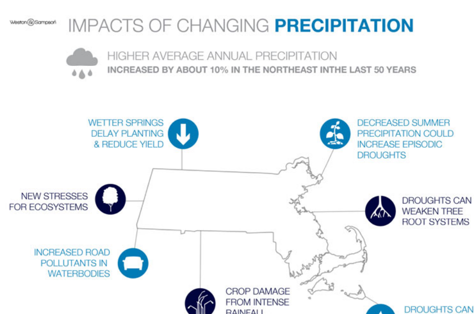

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Changes in Precipitation." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/changes-in-precipitation

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HURRICANES AND NOR'EASTERS

Upward trend in North Atlantic hurricane activity since 1970

2012: Hurricane Sandy
2017: Hurricane Jose
2018: Hurricane Florence
2019: Hurricane Dorian

Nor'easters along the Atlantic coast are increasing in frequency and intensity

Jan 3-4, 2018: Winter Storm Grayson
March 2, 2018: Winter Storm Riley
March 8, 2018: Winter Storm Quinn
March 13, 2018: Winter Storm Skylar

Source: Climate Science Special Report, Fourth National Climate Assessment (NCA4), Volume prepared by the U.S. Global Change Research Program (USGCRP)/Northern Middlesex

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WIND-RELATED HAZARDS

Photo: Town of Reading, MA Facebook

Increase in intensity of severe thunderstorms

Tree damage
Downed power line

26

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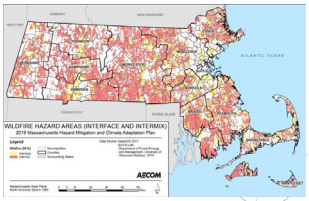
BRUSH FIRE



Map: Wildfire Hazard Areas, 2018 Massachusetts Hazard Mitigation and Climate Adaptation Plan, p4-176

26 brush fires occur annually, approximately

10% involve significant property damage

Causes:
- Weather conditions, lack of rainfall, winds, and lightning
- Careless disposal of cigarettes

Town of Reading, Hazard Mitigation Plan, 2017

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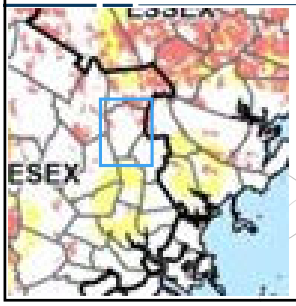
BRUSH FIRE



LOCALLY IDENTIFIED AREAS OF FIRE RISK

- Undeveloped forested land north of Fairchild Drive
- Undeveloped forested land in northeast Reading and Cedar Swamp area
- Town Forest
- Open land area off Grove Street
- Bear Meadow Conservation Area
- Camp Curtis- National Guard area
- Route 93 interstate highway corridor

Map: Wildfire Hazard Areas, 2018 Massachusetts Hazard Mitigation and Climate Adaptation Plan, p4-176
Reading Hazard Mitigation Plan, 2017

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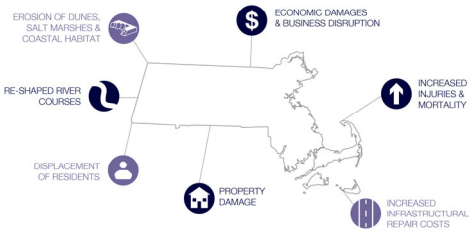
IMPACTS OF EXTREME WEATHER

STORMS ARE BECOMING MORE INTENSE AND DAMAGING



Massachusetts Executive Office of Energy & Environmental Affairs, 2019, "Extreme Weather." Massachusetts Climate Change Clearinghouse, http://www.resilientma.org/changes/extreme-weather

29

29

3 WEBINARS

INFRASTRUCTURE ASSETS

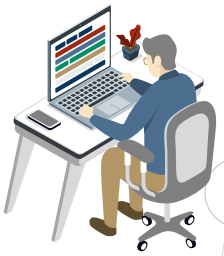
COMMUNITY RESILIENCE

ENVIRONMENT AND LAND USE

30

30

NEXT STEPS



ONLINE SURVEY
- https://tinyurl.com/ReadingMVPWorkshop

MATERIALS SHARED PRIOR TO WORKSHOP
- Critical facilities map
- Agenda
- PDF of Workshop

PLEASE REMEMBER TO RSVP

ATTEND WORKSHOP AND LISTENING SESSION

31

31

THANK YOU

Weston & Sampson

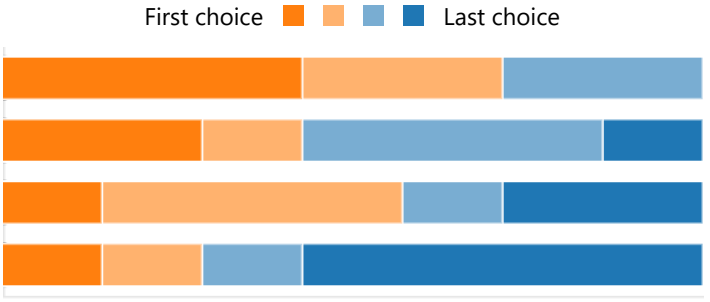
32

Reading MVP: Pre-Workshop Survey

9	20:21	Active
Responses	Average time to complete	Status

1. Reading has identified the following hazards as being particularly relevant to the Town. Please rank the hazard from What hazard are you most concerned about?

Rank	Options
1	Intense Precipitation and Floo...
2	Extreme Temperatures
3	Snow Fall and Blizzards
4	Wind



2. How have these hazards impacted you or your department? Memories of climate hazards could include impacts from: - flooding of local roads - drought conditions in 2016 - four Nor'easters in one month in 2018 - heat waves with multiple days over 90 degrees

8
Responses

Latest Responses

"all of the above"

"The large old trees in parts of Reading that have fallen in the recent b...

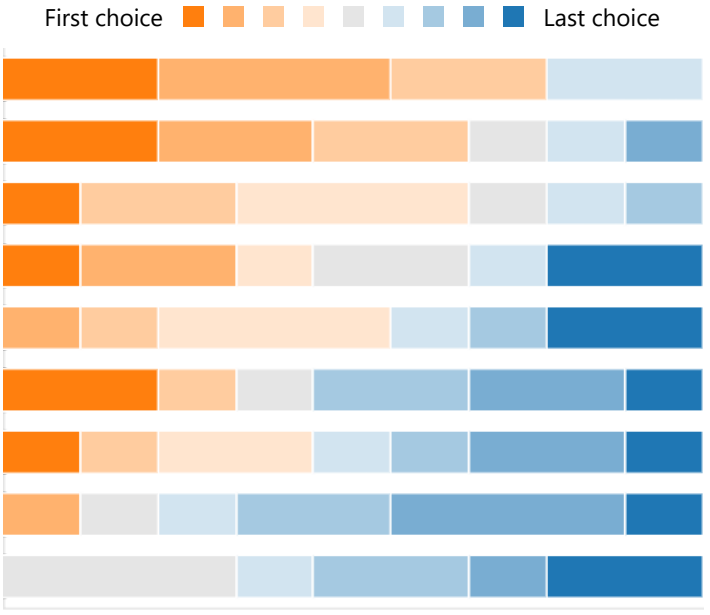
"Heat waves affecting students at RMHS with overheated classrooms D...

3. How prepared do you feel the Town of Reading is for climate change?

Very prepared	1
Somewhat prepared	6
Not prepared	1
Other	0

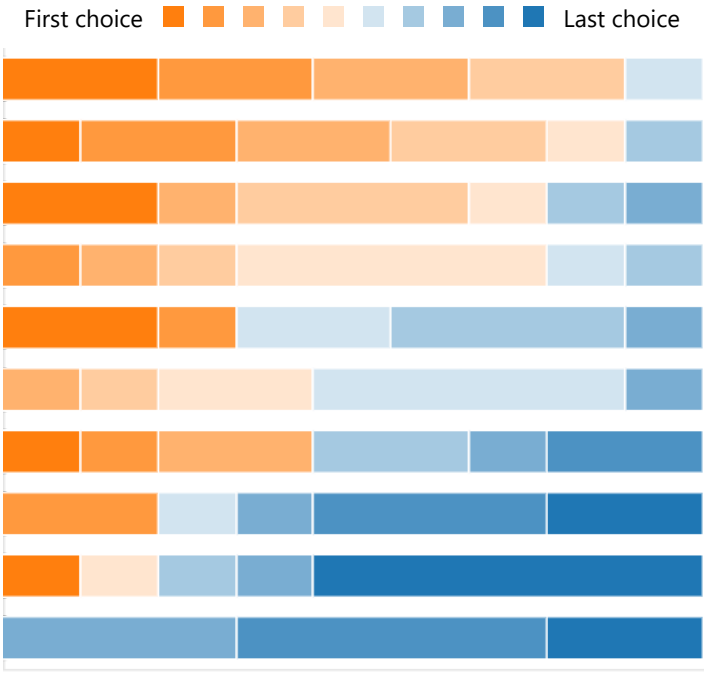
4. At the upcoming workshop, we'll have an opportunity to discuss six infrastructural features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Rank	Options
1	Electric grid
2	Water supply
3	Roadways
4	Municipal buildings and servic...
5	Wastewater treatment and col...
6	Stormwater collection system
7	Communication infrastructure ...
8	Culverts
9	Bridges



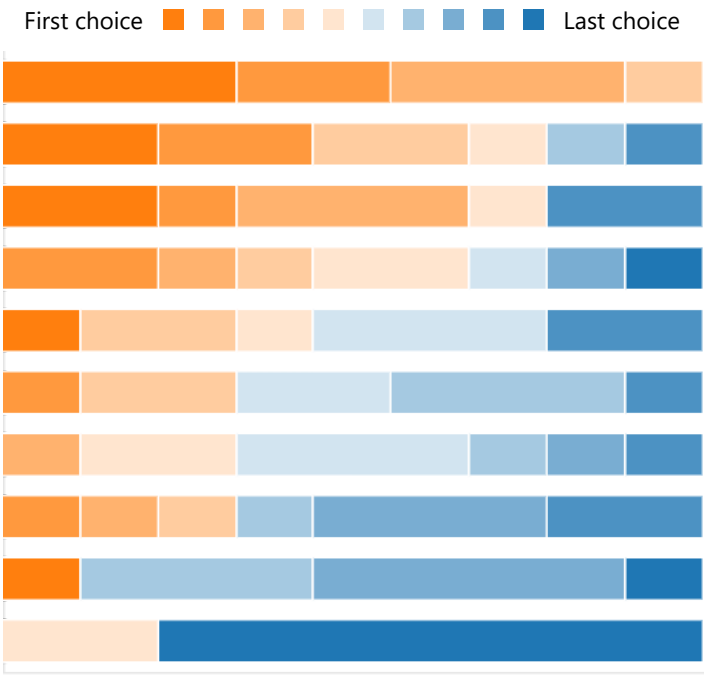
5. At the upcoming workshop, we'll have an opportunity to discuss six environmental features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Rank	Options
1	Rivers and streams
2	Swamps and marshes
3	Bylaws and regulations (zonin...
4	Parks and forests
5	Development patterns
6	Street trees/tree canopy
6	Water pollution
7	Erosion
8	Invasive species
9	Contaminated sites



6. At the upcoming workshop, we'll have an opportunity to discuss six economic and community health features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Rank	Options
1	Barriers to personal resilience ...
2	Emergency communications
3	Mobility
4	Risk of isolation
5	Downtown District and local b...
6	Senior Center
7	Local organizations
8	Vector-borne diseases
9	Youth services
10	



7. What does Reading do well to to mitigate hazards or prepare for climate change? Examples could include, but are not limited to: - Town shelters, warming centers, and cooling centers - Regional collaboration, including Mutual Aid Agreements with Police Departments in neighboring Towns

8

Responses

Latest Responses

"Regional collaboration and mutual aid agreements"

"The distribution of water when there was a problem with ecoli present...

"Mission of Deeds, Food Pantry"

8. What are the opportunities to address potential natural or climatic hazards? Examples could include, but are not limited to: - Providing transportation to shelters for vulnerable populations, including elderly and low-income residents - Addressing frequently flooded roads

7

Responses

Latest Responses

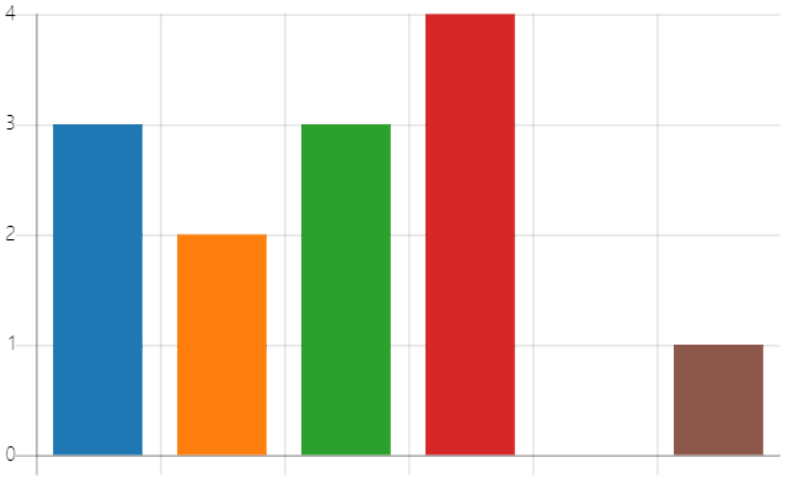
"Shelters and access to shelters. Knowing where vulnerable population...

"I am concerned with the vulnerability of our older citizens especially ...

"-Providing transportation to shelters for vulnerable populations, inclu...

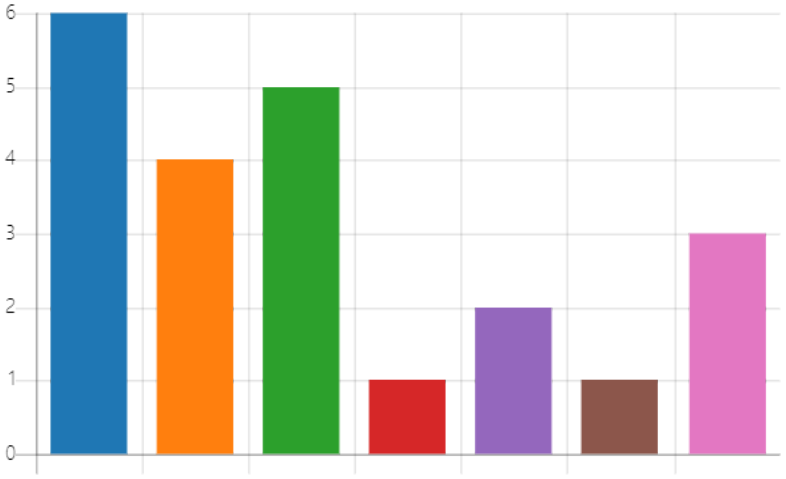
9. What resources does your department or organization need to be more prepared?

Funding for climate adaptatio...	3
Staff and training	2
Data or studies showing the p...	3
Additional guidance related to...	4
Supplies and Equipment	0
Other	1



10. How does your department or organization share information with the public?

Public events and virtual webi...	6
Printed media: reports, fact sh...	4
Website	5
Newsletters	1
Social media	2
Targeted outreach to specific ...	1
Other	3



11. We recognize the preparation and response to any challenge in our community has overlapping strategies and challenges. We are interested in documenting the community experience of COVID-19. What worked well? What could improve?

7

Responses

Latest Responses

"I think that the Covid-19 response has been challenging. I applaud th...

"Very efficient distribution of masks to residents on May 6"

12. Are there any additional comments or questions you would like to share with the project team?

1

Responses

Latest Responses

13. Thank you for completing the survey. Please enter your name below.

9

Responses

Latest Responses

"*Jay Corey*"

"*hillary* "

"*Martha Moore*"

Reading MVP: Pre-Workshop Survey

As a leader in our community, we are sure that you are busier than ever. Thank you for taking the time to fill out this survey. Your experience, ideas, and comments will improve our planning process as we analyze the potential for future climate impacts. This survey will be available until May 14, 2020. If you have additional input, questions, or barriers to participating, please contact Andrew MacNichol by email (amacnichol@ci.reading.ma.us) or phone (781-942-6674).

1.Reading has identified the following hazards as being particularly relevant to the Town. Please rank the hazard from What hazard are you most concerned about?

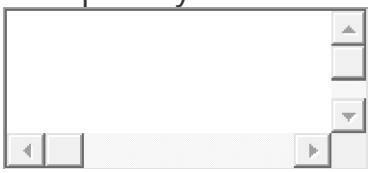
Intense Precipitation and Flooding

Extreme Temperatures

Wind

Snow Fall and Blizzards

2.How have these hazards impacted you or your department? Memories of climate hazards could include impacts from: - flooding of local roads - drought conditions in 2016 - four Nor'easters in one month in 2018 - heat waves with multiple days over 90 degrees



3.What infrastructural features do yo

- ○ Very prepared
- ○ Somewhat prepared
- ○ Not prepared
- ○

4.At the upcoming workshop, we'll have an opportunity to discuss six infrastructural features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Electric grid

Roadways

Bridges

Stormwater collection system

Culverts

Water supply

Wastewater treatment and collection

Communication infrastructure (cell towers, data centers, etc.)

Municipal buildings and services (including emergency services)

5.At the upcoming workshop, we'll have an opportunity to discuss six environmental features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Rivers and streams

Swamps and marshes

Parks and forests

Street trees/tree canopy

Development patterns

Bylaws and regulations (zoning, wetlands protection, etc.)

Water pollution

Contaminated sites

Erosion

Invasive species

6.At the upcoming workshop, we'll have an opportunity to discuss six economic and community health features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most important to least important when considering Reading's climate resilience.

Risk of isolation

Mobility

Barriers to personal resilience (such as income)

Emergency communications

Local organizations

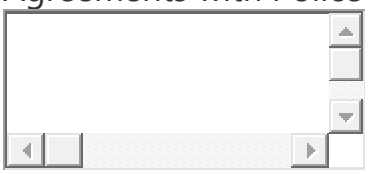
Senior Center

Youth services

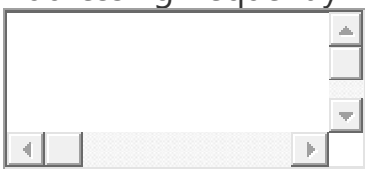
Vector-borne diseases

Downtown District and local businesses

7.What does Reading do well to to mitigate hazards or prepare for climate change? Examples could include, but are not limited to: - Town shelters, warming centers, and cooling centers - Regional collaboration, including Mutual Aid Agreements with Police Departments in neighboring Towns



8.What are the opportunities to address potential natural or climatic hazards? Examples could include, but are not limited to: - Providing transportation to shelters for vulnerable populations, including elderly and low-income residents - Addressing frequently flooded roads



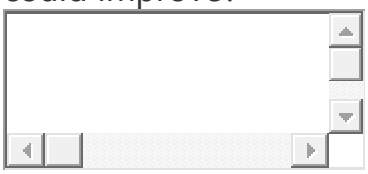
9.What resources does your department or organization need to be more prepared?

- [ ] Funding for climate adaptation projects
- [ ] Staff and training
- [ ] Supplies or equipment
- [ ] Additional guidance related to department operations before, during, and after a hazard event
- [ ] Data or studies showing the projected impacts of future climate hazards in Reading
- [ ]

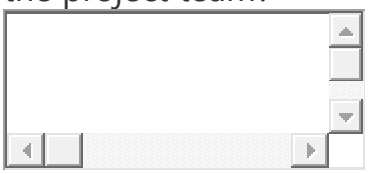
10.How does your department or organization share information with the public?

- [ ] Public events and virtual webinars
- [ ] Printed media: reports, fact sheets, or brochures
- [ ] Website
- [ ] Newsletters
- [ ] Social media
- [ ] Targeted outreach to specific demographics

11.We recognize the preparation and response to any challenge in our community has overlapping strategies and challenges. We are interested in documenting the community experience of COVID-19. What worked well? What could improve?



12.Are there any additional comments or questions you would like to share with the project team?



13.Thank you for completing the survey. Please enter your name below.

ID	Reading has identified the following hazards as being particularly relevant to the Town. Please rank the hazard from What hazard are you most concerned about?	How have these hazards impacted you or your department? Memories of climate hazards could include impacts from: - flooding of local roads - drought conditions in 2016 - four Nor'easters in one mo...	How prepared do you feel the Town of Reading is for climate change?	At the upcoming workshop, we'll have an opportunity to discuss six infrastructural features. Features can be both strengths and vulnerabilities in the community. Please rank the following from mos...	At the upcoming workshop, we'll have an opportunity to discuss six environmental features. Features can be both strengths and vulnerabilities in the community. Please rank the following from most ...	At the upcoming workshop, we'll have an opportunity to discuss six economic and community health features. Features can be both strengths and vulnerabilities in the community. Please rank the foll...	What does Reading do well to to mitigate hazards or prepare for climate change? Examples could include, but are not limited to: - Town shelters, warming centers, and cooling centers - Regional col...
1	Intense Precipitation and Flooding;Snow Fall and Blizzards ;Extreme Temperatures;Wind;	As a local residential architect, flooding of basements in our homes poses a heath issue, particularly if homeowners have finished spaces prior to the increase in flooding. Additional snow loads to structures is also a large concern.		Stormwater collection system;Municipal buildings and services (including emergency services);Communication infrastructure (cell towers, data centers, etc.);Wastewater treatment and collection;Water supply;Electric grid;Roadways;Culverts;Bridges;	Development patterns;Rivers and streams;Swamps and marshes;Bylaws and regulations (zoning, wetlands protection, etc.);Parks and forests;Street trees/tree canopy;Water pollution;Invasive species;Contaminated sites;Erosion;	Barriers to personal resilience (such as income);Mobility;Vector-borne diseases;Senior Center;Downtown District and local businesses;Risk of isolation;Local organizations;Youth services;Emergency communications;;	Great emergency communication services
2	Extreme Temperatures;Intense Precipitation and Flooding;Snow Fall and Blizzards ;Wind;	Precipitation management is a huge issue and has damaged many residents' properties. People are very upset with chronic flooding in their neighborhoods and basements.	Not prepared	Stormwater collection system;Culverts;Roadways;Municipal buildings and services (including emergency services);Bridges;Electric grid;Communication infrastructure (cell towers, data centers, etc.);Water supply;Wastewater treatment and collection;	Bylaws and regulations (zoning, wetlands protection, etc.);Development patterns;Swamps and marshes;Rivers and streams;Invasive species;Street trees/tree canopy;Parks and forests;Water pollution;Contaminated sites;Erosion;	Youth services;Senior Center;Barriers to personal resilience (such as income);Vector-borne diseases;Local organizations;Downtown District and local businesses;Emergency communications;Risk of isolation;Mobility;;	Library as a public gathering place and information resource.
3			Very prepared	Communication infrastructure (cell towers, data centers, etc.);Municipal buildings and services (including emergency services);Electric grid;Roadways;Culverts;Water supply;Wastewater treatment and collection;Stormwater collection system;Bridges;	Water pollution;Parks and forests;Rivers and streams;Swamps and marshes;Street trees/tree canopy;Development patterns;Bylaws and regulations (zoning, wetlands protection, etc.);Contaminated sites;Erosion;Invasive species;	Downtown District and local businesses;Risk of isolation;Mobility;Barriers to personal resilience (such as income);Emergency communications;Local organizations;Senior Center;Youth services;Vector-borne diseases;;	
4	Intense Precipitation and Flooding;Snow Fall and Blizzards ;Extreme Temperatures;Wind;	The preservation of wet lands for excess water retention thereby protecting the built environment.	Somewhat prepared	Municipal buildings and services (including emergency services);Electric grid;Water supply;Roadways;Stormwater collection system;Wastewater treatment and collection;Culverts;Bridges;Communication infrastructure (cell towers, data centers, etc.);	Bylaws and regulations (zoning, wetlands protection, etc.);Swamps and marshes;Rivers and streams;Parks and forests;Street trees/tree canopy;Development patterns;Water pollution;Contaminated sites;Erosion;Invasive species;	Mobility;Emergency communications;Barriers to personal resilience (such as income);Downtown District and local businesses;;Local organizations;Senior Center;Youth services;Vector-borne diseases;Risk of isolation;	Reading has good mutual aid; a responsive DPW; an active volunteer Climate Change Commission.
5	Snow Fall and Blizzards ;Wind;Intense Precipitation and Flooding;Extreme Temperatures;	The biggest impact was the 4 Nor'easters in 2018. Thinking back it was similar to the covid-19 lock down but worse. The timing was terrible, stores were closed and even when they finally did open there was no guarantee that you would be shoveled out when you needed to go. Then there was the question of where to put the snow.	Somewhat prepared	Electric grid;Water supply;Wastewater treatment and collection;Communication infrastructure (cell towers, data centers, etc.);Municipal buildings and services (including emergency services);Roadways;Bridges;Stormwater collection system;Culverts;	Development patterns;Erosion;Water pollution;Bylaws and regulations (zoning, wetlands protection, etc.);Parks and forests;Rivers and streams;Swamps and marshes;Street trees/tree canopy;Contaminated sites;Invasive species;	Barriers to personal resilience (such as income);Vector-borne diseases;Mobility;Emergency communications;Risk of isolation;Downtown District and local businesses;Senior Center;Youth services;Local organizations;;	The RMLD does an excellent job responding to outages. I can only recall a few town wide outages over the last 25 years. Most outages are resolved within a few hours. DPW is also good at responding to issues, be it flooding or blizzards.
6	Extreme Temperatures;Intense Precipitation and Flooding;Wind;Snow Fall and Blizzards ;	had to shut down a road due to localized flooding.	Somewhat prepared	Water supply;Wastewater treatment and collection;Electric grid;Roadways;Municipal buildings and services (including emergency services);Communication infrastructure (cell towers, data centers, etc.);Bridges;Culverts;Stormwater collection system;	Rivers and streams;Swamps and marshes;Water pollution;Bylaws and regulations (zoning, wetlands protection, etc.);Parks and forests;Street trees/tree canopy;Development patterns;Contaminated sites;Erosion;Invasive species;	Barriers to personal resilience (such as income);Emergency communications;Mobility;Risk of isolation;;Downtown District and local businesses;Vector-borne diseases;Local organizations;Senior Center;Youth services;	The Town has strong relationships with their surrounding cities/towns, including mutual aid. The Town tries to take a proactive approach when a disaster is forecast and has put in a great deal of effort to strengthen interdepartmental communication and planning.
7	Intense Precipitation and Flooding;Snow Fall and Blizzards ;Extreme Temperatures;Wind;	Heat waves affecting students at RMHS with overheated classrooms Driving through flooded lanes on Rt. 28 north of the high school after heavy rains Winter of 2015(?) with repeated snowstorms caused ice dams and water damage to my home.	Somewhat prepared	Electric grid;Water supply;Stormwater collection system;Wastewater treatment and collection;Roadways;Bridges;Culverts;Communication infrastructure (cell towers, data centers, etc.);Municipal buildings and services (including emergency services);	Swamps and marshes;Rivers and streams;Parks and forests;Street trees/tree canopy;Bylaws and regulations (zoning, wetlands protection, etc.);Erosion;Invasive species;Development patterns;Water pollution;Contaminated sites;	Emergency communications;Barriers to personal resilience (such as income);Local organizations;Downtown District and local businesses;Risk of isolation;Senior Center;Youth services;Vector-borne diseases;Mobility;;	Mission of Deeds, Food Pantry
8	Wind;Extreme Temperatures;Intense Precipitation and Flooding;Snow Fall and Blizzards ;	The large old trees in parts of Reading that have fallen in the recent bouts of wind. I am most concerned with the safety of our structures, people and roads during the high winds we have been experiencing.	Somewhat prepared	Roadways;Electric grid;Water supply;Communication infrastructure (cell towers, data centers, etc.);Bridges;Municipal buildings and services (including emergency services);Stormwater collection system;Culverts;Wastewater treatment and collection;	Invasive species;Erosion;Street trees/tree canopy;Rivers and streams;Swamps and marshes;Parks and forests;Development patterns;Bylaws and regulations (zoning, wetlands protection, etc.);Water pollution;Contaminated sites;	Emergency communications;Barriers to personal resilience (such as income);Risk of isolation;Senior Center;Mobility;Local organizations;Youth services;Vector-borne diseases;Downtown District and local businesses;;	The distribution of water when there was a problem with ecoli present was impressive. I was proud of how quickly and well Reading identified the issue and kept the population informed. I am not a Facebook user and I got the news quickly and accurately with a call from the town's emergency system.
9		all of the above	Somewhat prepared	Water supply;Electric grid;Roadways;Wastewater treatment and collection;Bridges;Culverts;Stormwater collection system;Communication infrastructure (cell towers, data centers, etc.);Municipal buildings and services (including emergency services);	Rivers and streams;Water pollution;Bylaws and regulations (zoning, wetlands protection, etc.);Swamps and marshes;Parks and forests;Street trees/tree canopy;Development patterns;Erosion;Contaminated sites;Invasive species;	Mobility;Risk of isolation;Barriers to personal resilience (such as income);Emergency communications;Local organizations;Senior Center;Youth services;Vector-borne diseases;Downtown District and local businesses;;	Regional collaboration and mutual aid agreements

What are the opportunities to address potential natural or climatic hazards? Examples could include, but are not limited to: - Providing transportation to shelters for vulnerable populations, incl...	What resources does your department or organization need to be more prepared?	How does your department or organization share information with the public?	We recognize the preparation and response to any challenge in our community has overlapping strategies and challenges. We are interested in documenting the community experience of COVID-19. What w...	Are there any additional comments or questions you would like to share with the project team?	Thank you for completing the survey. Please enter your name below.
Protecting open spaces and better town drainage.	Data or studies showing the projected impacts of future climate hazards in Reading;	Person to person;	Good dissemination of information via the Town's website.		Nancy Twomey
Increasing green and/or low impact development, planning and engineering designs.	Funding for climate adaptation projects;	Public events and virtual webinars;Website;	Neighborly goodwill is a basic strength across the town. An increased dialogue, open smart discussion about what problems are most important and why- we need to have more constructive dialogue between politically divergent peoples.		Annika Scanlon
		email;Public events and virtual webinars;Printed media: reports, fact sheets, or brochures;Website;			Laura Vlasuk
The need to raise public awareness prior to worsening changes in order to create responsive citizens.	Additional guidance related to department operations before, during, and after a hazard event;Data or studies showing the projected impacts of future climate hazards in Reading;	Public events and virtual webinars;	Personally satisfied with community response.		Virginia Adams
	Staff and training;	Public events and virtual webinars;Printed media: reports, fact sheets, or brochures;Website;	It is hard to say. The covid-19 response has been less than stellar, but is that due to federal, state or town government. Would the more drastic measures that have been taken, been acceptable earlier in the pandemic? Should governments use overwhelming force to combat these issues or aim for a minimally disruptive response?	The impacts from climate change will occur slowly over time, but still far faster than people realize. The challenge will be finding the point between an adequate response and full coverage response. For example, should electrical and communication lines be moved underground now or wait until disaster strikes? Should the flood plain overlay district be re-evaluated and expanded, possibly limiting growth? Do we require backup generators for new buildings, or air conditioners, increasing housing costs?	Tony D'Arezzo
Improving the drainage system to mitigate road flooding and property damage.	Funding for climate adaptation projects;Data or studies showing the projected impacts of future climate hazards in Reading;	Public events and virtual webinars;Printed media: reports, fact sheets, or brochures;Website;Newsletters;Social media;Targeted outreach to specific demographics;	The teamwork and adaptability of the employees was instrumental. Communication is always important, even when there is a lack of response, just knowing that there is a group working on the situation and developing a plan is helpful. Having more PPE and faster response could always improve. Creative solutions should always be welcomed and explored.		Ryan Percival
-Providing transportation to shelters for vulnerable populations, including elderly and low-income residents - Addressing frequently flooded roads -Air conditioning in schools	Additional guidance related to department operations before, during, and after a hazard event;		Very efficient distribution of masks to residents on May 6		Martha Moore
I am concerned with the vulnerability of our older citizens especially with the current pandemic causing disruptions to our lives. I am also concerned about our water, power, and communication systems especially now since we are relying solely on the town during the lock down, and do not have many opportunities to move about.	Additional guidance related to department operations before, during, and after a hazard event;	i don't provide information to the public;	I think that the Covid-19 response has been challenging. I applaud the efforts of the schools and community to adapt and change to address the new normal. I wish the mask wearing and communication had been a little more proactive but I do appreciate the amount of varying information we are working with.		hillary
Shelters and access to shelters. Knowing where vulnerable populations live, elderly, handicapped, etc.	Funding for climate adaptation projects;Staff and training;Supplies or equipment;Additional guidance related to department operations before, during, and after a hazard event;	Public events and virtual webinars;Printed media: reports, fact sheets, or brochures;Website;Social media;			Jay Corey

TOWN OF READING

Municipal Vulnerability Preparedness Planning Grant Project

Community Resilience Webinar Series, May 19th-21st, 12PM-2PM

Zoom Meeting Link – Call in instructions below*

Meeting ID: 870 6210 3133

Password: ReadingMVP

You may find the pre-workshop survey here, and the pre-workshop video here.

Welcome and Introductions	5 minutes
MVP Program Overview	5 minutes
Climate Change Data and Impacts	5 minutes
Climate Adaptation Strategies	15 minutes
Risk Matrix – Strengths and Vulnerabilities	15 minutes
Action Items	40 minutes
Wrap Up and Next Steps	5 minutes

*If you are calling in for audio, please use the details below. If you can join on the web app for the visual presentation and interactive session, that would be great. Otherwise we will send the powerpoint and materials prior to the meeting.
Number: 1-929-205-6099
Meeting ID: 870 6210 3133
Password: 605780

Weston & Sampson

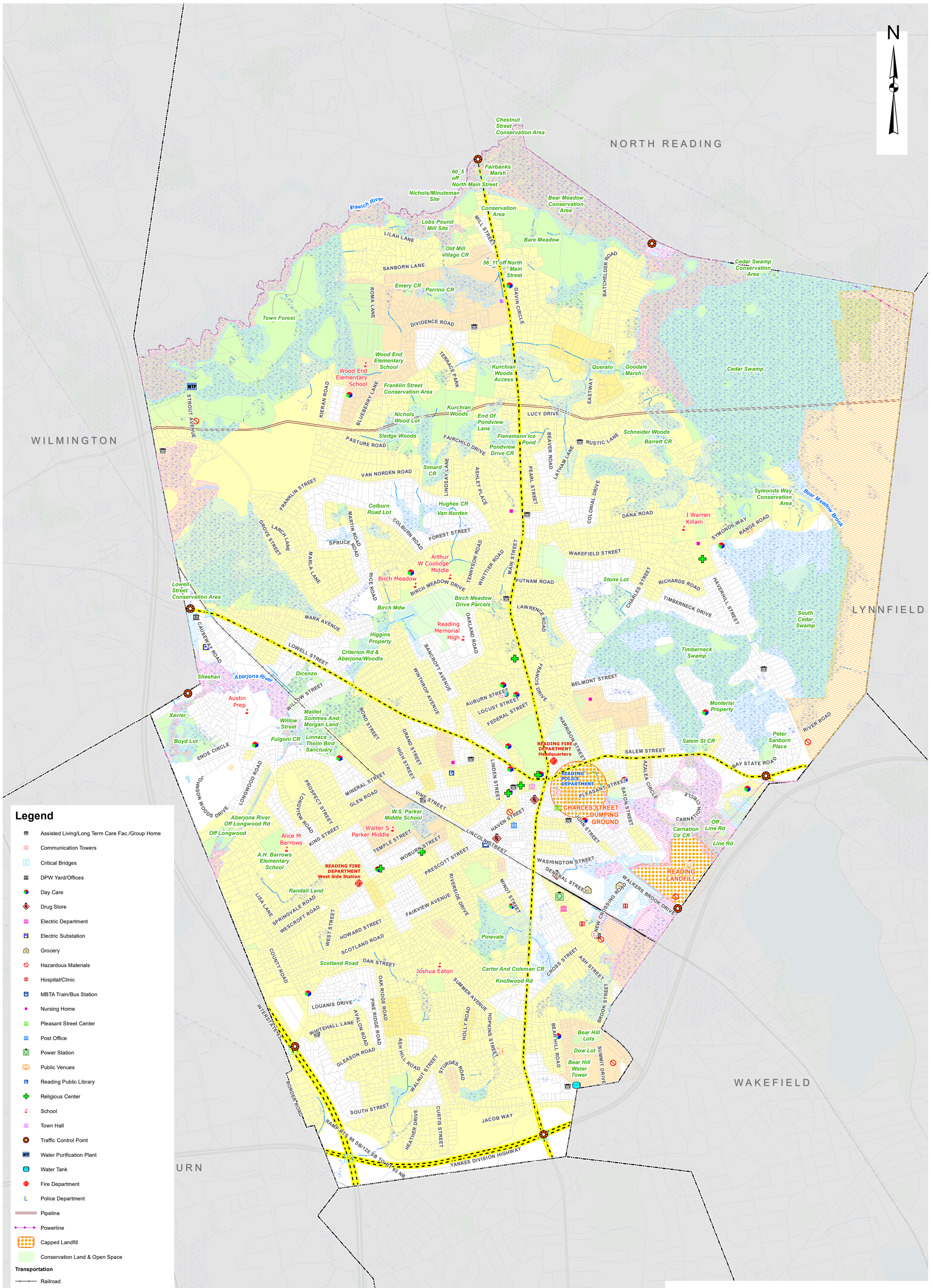


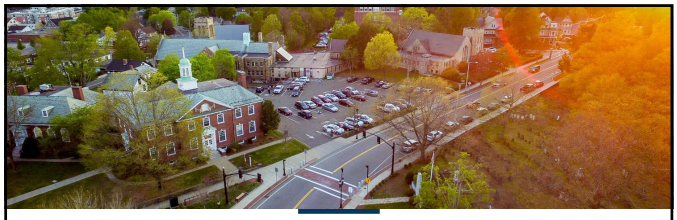
FIGURE 1

TOWN OF READING, MASSACHUSETTS

MUNICIPAL VULNERABILITY PREPARDNESS HAZARD AND FEATURE MAP

APRIL, 2020 SCALE: NOTED

Weston & Sampson



TOWN OF READING

Community Resilience Building Workshop - Infrastructure

Weston & Sampson — Photo: Town of Reading Twitter — 1

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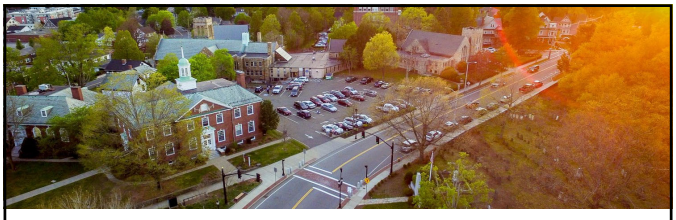

WELCOME PARTICIPANTS

Weston & Sampson — Photo: Kinetic Sculpture Festival, W&S — 2

2

LOGISTICS

- This webinar is being **recorded**
- Comment in the chat!
- Materials shared for **comment:**
  - Risk Matrix
  - Hazard Maps
- Materials shared for **reference:**
  - Critical facilities list
  - PDF of presentation
  - Agenda

3

3

WEBINAR OUTLINE

PRESENTATION:
- Overview of the MVP
- Climate Change Impacts
- Adaptation Strategies

DISCUSSION:
- Hazards in Reading
- Vulnerabilities and Strengths
- Identify and Prioritize Action Items

Photo: Reading Facebook

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MVP PROCESS

1. **MVP Planning Grant**
   - Define climate hazards
   - Identify community vulnerabilities and strengths
   - Develop and prioritize adaptation actions
   - Receive MVP designation
2. **MVP Action Grant**
   - Implement priority adaptation actions identified during the planning process

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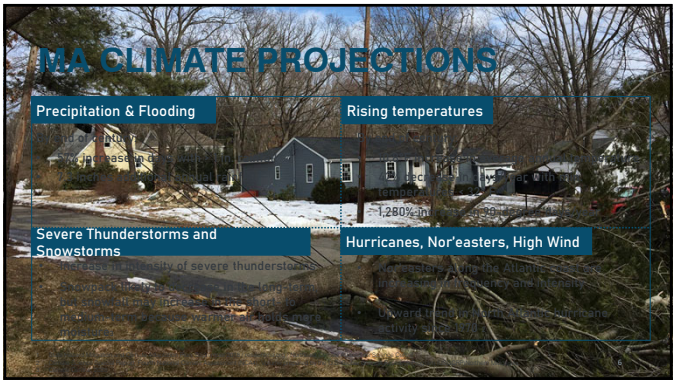

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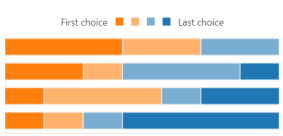
CLIMATE HAZARDS

Rank	Options
1	Intense Precipitation and Flooding
2	Extreme Temperatures
3	Snow and Blizzards
4	Wind-Related Hazards



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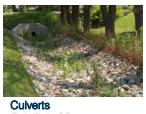
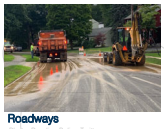
INFRASTRUCTURAL FEATURES


Reading Municipal Light Department (RMLD)


Emergency Services


Wastewater Treatment and Collection


Culverts


Roadways


Water Supply

8

INFRASTRUCTURAL FEATURES

- No permitted dams in Reading
- Water supply - MWRA
- Wastewater treatment facilities – Deer Island
- Communications facilities
- Commuter rail
- Interstate highways
- Solid waste management – Covanta- Haverhill
- Electric – Municipal Light Department
- Natural gas
- Municipal Buildings

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CLIMATE IMPACTS: INFRASTRUCTURE

INCREASED STRESS OR RISK OF FAILURE OF CRITICAL INFRASTRUCTURE

INCREASED REPAIR COSTS

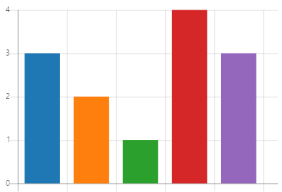
STRAIN ON LOCAL WATER SUPPLY

PROPERTY DAMAGE

10

What resources does your department or organization need to be more prepared?

- Funding for climate adaptation projects
- Staff and training
- Supplies or Equipment
- Additional guidance related to department operations, before, during, and after a hazard event
- Data or studies showing the project impacts of future climate hazards in Reading



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ADAPTATION STRATEGIES

Survey results:

- Improving drainage system to mitigate flooding and property damage
- Redundancy in water, power, and communication systems


Photo: Reading Fire Department Twitter

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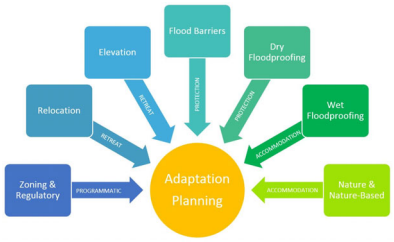
ADAPTATION STRATEGY TYPES



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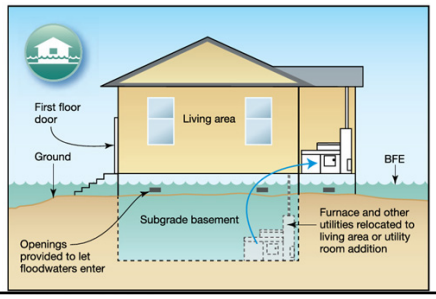
WET FLOODPROOFING



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RAISED BUILDINGS

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RETROFITTED FLOODPROOF DOORWAYS

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DEPLOYABLE FLOOD BARRIER

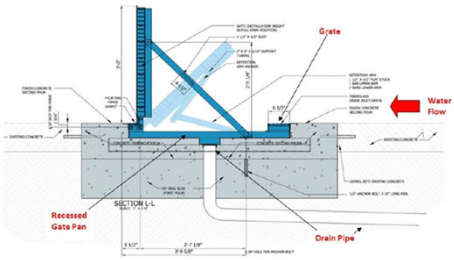

FIGURE 1 | A FloodBreak barrier gate diagram

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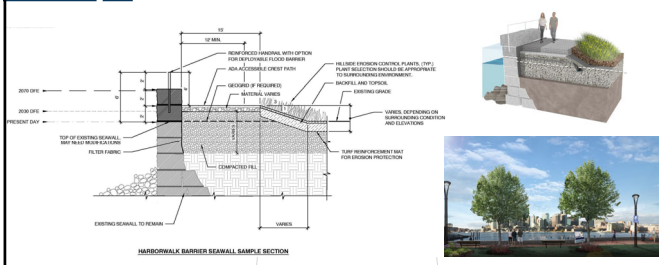
FLOOD WALLS



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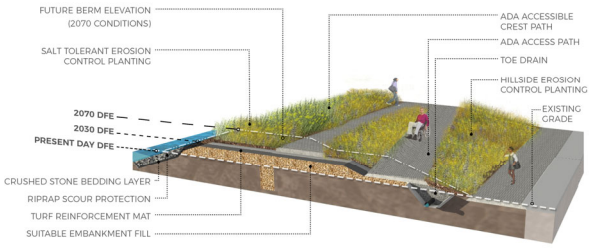
VEGETATED BERM



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MULTI-PURPOSE FLOOD STORAGE

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LOW IMPACT DEVELOPMENT (LID)

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Bioretention and Raingardens

Rain Garden in a median strip of a townhouse project. Please note the depressed curb and grate inlet structure

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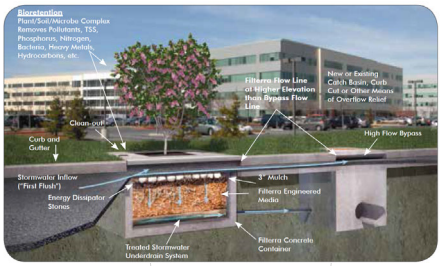
STREET TREES & TREE BOX FILTERS



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STORMWATER DETENTION & RETENTION

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POROUS ASPHALT & PERMEABLE PAVERS

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CULVERT WIDENING TO IMPROVE HABITAT & FLOW

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CLOUDBURST STREETS

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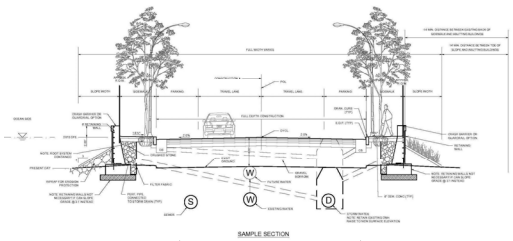
RAISED ROADWAYS



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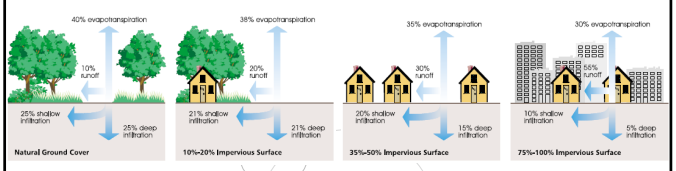
REDUCE IMPERVIOUS AREAS



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GREEN ROOFS

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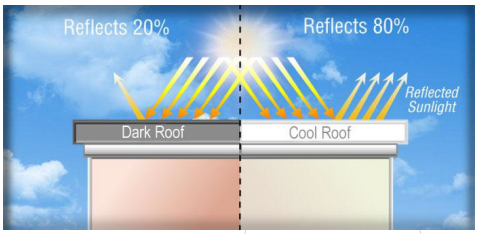
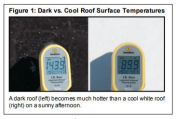
COOL ROOFS



Source: Heat Island Group at Lawrence Berkeley National Laboratory



Source: U.S. Department of Energy Guidelines for Selecting Cool Roofs

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COOLING CENTERS

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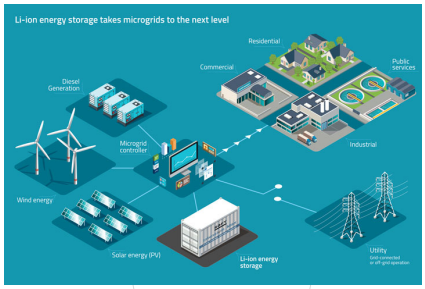
RENEWABLE ENERGY/MICRO-GRIDS



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Example MVP Action Grant Projects

Nature-Based Flood Protection, Drought Prevention, Water Quality, and Water Infiltration Techniques

Millbury

Utilizing green infrastructure like stormwater planters, bioretention bump outs, rain gardens, and other measures like porous pavers and pervious pavement to reduce heat island effects and stormwater runoff into the Blackstone River.

Nature-based solutions

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Example MVP Action Grant Projects

Redesigns and Retrofits

Salisbury

Increasing the resilience of the neighborhood of Ring's Island by raising its access/egress roads and by improving tidal flushing through culvert replacements

Vulnerable communities

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Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Intense Precipitation- Flooding - Drought	Extreme Temperatures	Snow and Blizzards	Wind-related Hazards (Nor'easters, Hurricanes, Severe Storms)	Priority H - M - L	Time Short Long Ongoing
Infrastructural									
Electric Grid	electric grid and generators	RMLD (covers 4 towns)	S/V-power may be unavailable during extreme temperatures/snow storms, wind damage, demand on system S- proactive tree management and vegetation mangement plan S- Two solar choice projects	Education about using energy off peak hours and conserving energy (peak moving from summer to the winter as we move to electric heat and EVs). Leverage rebate and incentive program (MassSave- where eligible). Additional solar caports in Reading.		Identify critical infrastructure in the town and where backup generators are needed.	Solar-battery back up systems to keep electric grid online	High	Ongoing
Water Supply	Few (backup) wells in the Ipswich basin, MWRA infrastructure	MWRA - Town	V- North Reading relies on Reading supply during drought/water supply emergencies (municipal interconnections, but they primarily rely on Andover) V- agreement with DEP that wells will be taken offline once redundancies are constructed. Aging system. Lead removal program.	Advocate to surrounding towns to join the MWRA (North Reading is in agreement with Andover now). Continue efforts to build redundancies of water supply. Booster stations are at risk of flooding.	Water conservation program is active-- continue to promote. Old end/flucuations cause water main breaks.	Back up generators for critical components.		Medium	Ongoing
Roadways	Willow St - most flood prone; Walkers Brook ares (near Austin Prep); Rte 28 Bridge did flood during Mother's Day flood	Town/ MassDOT/ Private	V- flooding S- public safety relies on roads for supplies, response	Pursue actions identifiedy with MyRWA for grants (one near Austin Prep- West St is the second best alternative in entire study); 3 locations to store flood waters. Just received funding on Track Rd. for small bridges. Look at opportunities for green infrastructure and enhancements -- Eastern Gateway (WBDR) and Lower Have St (downtown).			Funding for tree management, planting guidance	High	Ongoing
Municipal Buildings and Services	Specific buildings	Town	S- emergency management plan outlining cooling centers, lots of work on town facilities. Looks at energy use regularly.	Incorportate flood study from a few years ago.	Look at documents on town facilities to see where generators are neeed. Cool roofs on buildings with black tar roofs (schools would be a great example). Incorporate information from Phase I and II of energy usuage recommendations.		Look at solar on municipal buildings.	Medium	Long-term
Wastewater Treatment and Collection	12 pumping stations	Town	S- capital plan (replaced 3 out 12) prioritized based on volume and flow. Sewer system study in the econ. Dev. Areas. Continual I/I work, pilot program on sump pump removal	Protection of Deer Island from sea level rise.	Back up for pumping stations (new stations have redundancy in system) -- look for renewable sources/ generators with less air pollution		Continue I/I to reduce pollutant loading during large storms. Designs to meet capacity	Medium	Ongoing
Natural Gas	Townwide	Private- National Grid	V- leaks	Develop communication with private industry about shutoff valves, etc.				Medium	Short-Ongoing
Stormwater System (collection, storage, and treatment)	Townwide	Town	S- Enterprise fund that could possibly used for match, currently used for management of MS4 (phosphorus reduction is large component) and involved with MyWRA. Nice LID development throuhg waiver and conversation. V- culverts made from poor materials with old design storms that are no longer relevant. Finding that maintenance of LID is an issue	Update requirements on stormwater systems to use climate projected design storms and fish passage/wildlife benefits. LID designs to retrofit existing catch basins (with MyWRA). Balance LID and storm drainage. Pilot testing of tree box fileters. Paint "Do Not Dump" on storm drains (that have worn off). More training and funding for LID - GI maintenance and siting.				High	Short

Reading MVP CRB Webinar Series
Day 1 – Infrastructure Focus
Tuesday, May 19th
12 p.m. – 2 p.m.

Attendance

- Amanda Kohn – Weston & Sampson
- Steve Roy – Weston & Sampson
- Cassandra Albrecht – Weston & Sampson
- Core Team:
    - Jean Delios – Assistant Town Manager (Administration)
    - Andrew MacNichol – Staff Planner (Planning & Community Development)
    - Julie Mercier – Community Development Director (Planning & Community Development)
    - Jane Kinsella – Director of Public Works (Department of Public Works)
    - Chris Cole – Assistant Director of Public Works (Department of Public Works)
    - Ryan Percival – Town Engineer (Engineering Division)
    - Chuck Tirone – Conservation Administrator (Conservation Division)
- David Zeek – Climate Action Committee
- Hamid Jaffari – Director of Engineering & Operations (RMLD)
- Alex Rozycki – Senior Civil Engineer (Engineering Division)
- Martha Moore
- James Maughan
- Peter MacGown
- Sharon Angstrom
- Genevieve
- Hillary
- Alex Koppelman
- Travis Estes
- Tony D'Arezzo
- Kevin Furilla
- Nancy Twomey
- Annika
- Janet Walsh
- Flynn
- 617-823-5933
- (Unknown Participant)

Discussion

- Question asked by Hamid Jaffari (RMLD): Can the MVP Grant be used to fund renewable energy microgrids?
    - Answer: Yes.
        - An example is the Town of Monson.
        - Carport PV system where the energy will be stored in lithium ion batteries and will be connected into town center/emergency response center
        - 2011 tornado wiped out town center
        - New building was built and has diesel generator backup system – the PV system will allow them to be offline for up to 10 days if utility system goes off
        - Keeps emergency operations, police, and fire operating
    - Reading is looking into renewable energy microgrids and would be interested in a project like this
- Risk Matrix
    - Electric Grid
        - Overall it is a strength
        - Vulnerability is that during extreme heat/cold conditions the power may not be available
            - To have a resiliency plan for renewables is a great idea
        - Looking for opportunity to build solar on roofs, battery storage/battery packs in case of power outages
        - Backup generators for town facilities is a critical infrastructure
        - Need to identify critical infrastructure in Town
            - Town offices, schools, nursing homes
            - Which locations do not have backup generators?
        - Snow/blizzard or extreme heat are most important conditions
            - Capacity becomes a problem, high demand
        - With everyone home during COVID, there are demand concerns
            - Shred the peak efforts from RMLD?
                - Raise thermostat a couple degrees, would not notice the difference in the house
                    - This helps the system a lot, capacity wise
                - Do laundry off-peak
                - RMLD is using social media to ask customers to lower demand and do laundry, etc. off peak
                - Customer system is in the works (next year) – messages can be sent to customers, asking them to lower power usage during normal high-demand hours, etc.
                    - Helps customers save money as well
        - Jean Delios chimed in that there is an emergency management plan
            - This discusses cooling centers, etc. and other comments that have been brought up regarding the electric grid
            - There has been extensive work on capital and town facilities through planning documents

        - Need for backup generators has been incorporated
    - The Town should make sure to utilize these existing efforts and documents
- Forecasts from ISO New England point to peak moving from summer to winter because of efforts to vehicle charging, heat pumps, and migration of other heating systems (oil to electric)
- Concerns around peak – leverage the universe of incentive and rebate opportunities to make these available to customers
    - Weathering homes, thermostat changing a few degrees
- Solar Choice 1 and Solar Choice 2 projects from RMLD
    - Ratepayers can benefit from
    - Win/Win customer and RMLD
    - Help with issues during peak
    - Power/purchase agreement with customers
    - Residents pay an extra $3 per month to join and are now getting money off their bills
- Electric utilities underground?
    - In new developments, requiring it? To diminish risk?
    - New subdivisions have infrastructure underground
    - Moving old infrastructure is much too expensive
    - Can RMLD mandate this?
        - Town Planning Department mandates this
- Town has Contracted with Noresco (?) to look at energy utilization and how to better it
    - Phase 1 has been done
    - Looking to incorporate Phase 2 (Joe Huggins)
        - Improvement recommendations to further advance energy saving initiatives
- RMLD asked Reading to do solar installations on roofs of municipal buildings
    - Opportunity here

- Water Supply
    - MWRA – Have own backup supply via wells that are in Ipswich basin in the Town Forest
    - Surrounding towns are vulnerable – North Reading (generates own water, not MWRA)
    - Well fields should not be looked at as strength
        - Agreement with DEP that as soon as there is redundancy in system that these wells will be taken offline
            - Redundancy with MWRA (36-inch pipeline from Stoneham and Woburn)
            - Working towards taking these wells offline
    - Critical infrastructure – booster stations, water tanks
        - Water tank is degrading
        - Communications on tank are also critical infrastructure

        - Hoping to separate communications and water supply tank
        - Looking to update water supply tank
    - North Reading was working with Reading to connect up via MWRA but decided financially to go through Andover instead
    - Flooding with water supply – at booster stations and damaging electric infrastructure causing a shutdown
        - Backup generators are a priority when renovating booster stations or other critical infrastructure for utilities
    - Drought – MWRA could see an event to restrict use
        - Reading is active in water conservation, and so is typically not an issue
    - Snow/Blizzards or severe storms would knock out electrical grid and that effects booster stations or other powered utilities
    - Extreme cold – water main breaks (especially fluctuations)
    - Not giving up rights to wells – no interest in giving up rights in Town
        - Taking wells offline and not having to maintain them anymore is the goal
    - North Reading has a municipal agreement with Reading, but they primarily rely on Andover
        - They don't specifically rely on Reading for any drought supply
    - Aging water system and lead removal program
    - Two booster stations were retrofit into one station
        - Installing high efficiency VFDs at this retrofitted station as well
- Roadways
    - Some owned by Town/some by MassDOT/some private
    - Willow Street is vulnerable
        - Most flood-prone roadway at this time
    - Walkers Brook also most low-lying flood-prone waterway
    - Austin Prep/West Street
        - MVP Grant with Mystic River Watershed Association – for flood storage system
        - Other 3 acre plots of land are being looked at
        - West Street is designated at second best area for flood storage in the Mystic River Watershed
    - Bridge over Ipswich on Main Street flooded during Mother's Day storm
        - Been repaired, but keep it in mind
    - Several small bridges – one received a grant for a replacement on Track Road
        - MassDOT owns one across Ipswich and they own a couple others
    - Strength – public safety relies on it to get where they need, to move supplies
    - Concern – when a roadway is not passable (flooding, storm event with damage to roadway, tree blocking roadway)
        - Flash freezing and crashes can block roadway

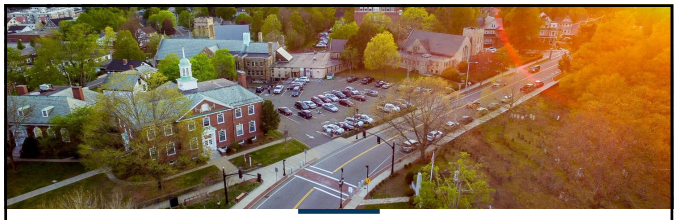
        - Are design standards for sizing of culverts/drainage infrastructure related to roadways up to date? Do they take into account extreme events?
            - Probably would need to be revised – looking at the storms nowadays are bigger than previous design storms
                - NOAA standards for precipitation events are required for developers
            - Many culverts are 50 or more years old and are made of inferior products (corrugated steel) – designed for 25 year storm, and maybe 50 -100 year storm
                - We are seeing bigger/more frequent storms now
            - These issues have been identified in watershed study (specific to Saugus River)
                - Done by Metcalf & Eddy and AECOM 4-5 years ago – Flood Study
            - Build in environmental considerations like fish passage when replacing culverts
        - Downed Power Lines
            - Tree Management/Maintenance?
            - Extreme interest of Town – maintain trees, have healthy/proactive tree department; RMLD is also active and proactive
                - Evident in service calls needed during high wind events
                - Could always have more funding for tree trimming/planting plans
            - RMLD has comprehensive vegetation management plan
                - Visited every 3 years
                - Reviewed with tree wardens
                - Tree trimming/tree hazard/tree removal plan is good
                - Could always use more
                - Important to reliability of power lines
                    - During storms, trees are biggest problem
            - Tree Species that are changing here?
                - Monitoring tree species, but do not think so
                - Pine trees are biggest problem typically
                - Emerald Ash
                - Bradford Pears are notoriously weak tree for storms
                - Can discuss this with Tree Warden
        - Roadways – Extreme temperatures
            - Long term development of eastern gateway (along Walkers Brook Drive) and Lower Haven Street (downtown)
                - Green bump outs and permeable pavement
    - Municipal Buildings
        - Municipal buildings, especially those schools which currently have black tar roofs, would be much improved by cool roof idea
    - Wastewater
        - 12 sewer pumping stations in Town

        - Study done in 2010 to assess their status, capital plan developed
        - Replaced 3/12, 4th is under design right now
        - Prioritized which ones out of 12 needed to be done first, based on volume/flow/condition
    - Hydraulic Analysis of sewer system – focused on economic development areas, within past year
    - Strength – MWRA & responsibility to remove I&I, yearly put out CIPP contracts (third contract in 3 years) and testing and sealing projects
        - Pilot program done in 2004/2005 for sump pumps for removal
    - Pump stations are critical infrastructure – extreme precipitation, have I&I issues through degraded leaking piping or through a lot of inflow (sump pumps)
        - Virtually impossible to remove from system, always more popping up
    - Issues with electric capacity if power outage
    - New stations that have been replaced – redundancy in the systems for SCADA and generator backups or bypass pumping around stations
    - Flooding of stations?
        - Do not have SSOs (in last 16 years has only happened a handful of times)
        - Design of new stations does look at flow modeling and meeting I&I capacities for the pumps
        - Look for the use of VFDs for the pumps to save energy where can
    - Deer Island was designed and built in 1980s before climate change and sea level rise was an issue
        - Are we working with MWRA to know what Reading will do if Deer Island is flooded?
            - MWRA is working on it, but Reading needs to know the plan and communicate as well
    - For stations that need to be replaced
        - Elon Musk batteries instead of diesel backup?
            - Noise and air pollution limited
            - Would like to consider this as an action item
- Natural Gas
    - Natural Gas – it is a vulnerability in and of itself (Lawrence pipeline)
        - Need to be alert to it
        - Communication problem
    - Natural gas is critical infrastructure but is private entity that the Town cannot expend any funds on – can help coordinate
    - Natural Gas – Private utility, need good communications (NGrid)
    - Extreme cold, water leaked into gas main and shut off gas to residents
        - Locations of shut off valves are generally not known on gas main
    - NGrid is preparing live leak map to show leaks in Town on a “real-time” basis
- Stormwater

- The hot topic these days
    - Has a lot to do with climate change and MVP
- Town is tasked to make sure that they follow MS4 permit in its entirety
    - Cumbersome
    - Staffing and funding is challenging when comes to MS4
    - Enterprise Fund is a huge strength for Reading
- Very good collaboration with a lot of watersheds and municipalities around Reading, as well as with EPA
    - Been on a lot of meetings that help to develop pitfalls with MS4 permit and moving forward
- Was always low priority of all utilities because as long as rainwater disappeared no one cared
    - Taking more proactive approach now instead of reactive
- Treatment
    - Under MS4 required to remove % of suspended solids and MDLs in river bodies, and reduce phosphorous
        - Phosphorous is big thing being pushed right now by the EPA
            - Will require a lot of recharge and re-infiltration system
            - Testing out LIDs in Town
                - Tree wells (problematic, but in testing phase)
            - Also collaborating with Mystic River Watershed
                - LID – retrofitting catch basins
- Engineering & Planning is working with developers to implement LID
    - Finding that LIDs work for certain period of time, but if not maintained properly they lose efficiency
    - Town is working for combined strategy with LID and then conventional detention basins, wetland areas, infiltration basins as well
- Development goes in, and system is given to Town to maintain
    - Town needs to be up on maintaining natural stormwater systems
        - DPW needs to be involved in this, update training?
- Reading is well-positioned stormwater wise
    - West Street 3-acre land is a great location for MVP
- Expand stormwater collection system box to include stormwater storage and stormwater treatment
    - Storage and treatment is equally as important as collection

- Prioritization
    - Electric Grid
        - High/Ongoing
    - Water Supply
        - Medium/Ongoing
    - Roadways
        - Low/Ongoing
        - High because critical during emergency response

        - Medium because of trees
        - Final decision – High
- Municipal Buildings/Services
    - Medium
    - Long Term
- Wastewater
    - Medium/Ongoing
- Natural Gas
    - Medium
    - Ongoing/Short Term
- Stormwater
    - High, Short Term



TOWN OF READING

Community Resilience Building Workshop - Societal

Weston & Sampson — Photo: Town of Reading Twitter — 1

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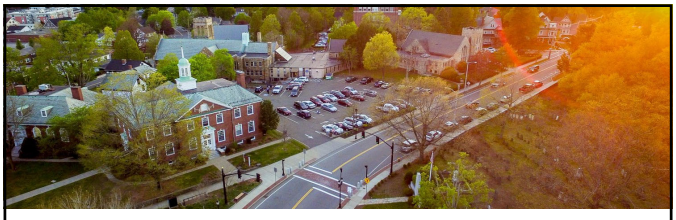

WELCOME PARTICIPANTS

Weston & Sampson — Photo: Kinetic Sculpture Festival, W&S — 2

2

LOGISTICS

- This webinar is being **recorded**
- Comment in the chat!
- Materials shared for **comment:**
  - Risk Matrix
  - Hazard Maps
- Materials shared for **reference:**
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  - PDF of presentation
  - Agenda

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3

WEBINAR OUTLINE

PRESENTATION:
- Overview of the MVP
- Climate Change Impacts
- Adaptation Strategies

DISCUSSION:
- Hazards in Reading
- Vulnerabilities and Strengths
- Identify and Prioritize Action Items

Photo: Reading Facebook

4

MVP PROCESS

1. **MVP Planning Grant**
   - Define climate hazards
   - Identify community vulnerabilities and strengths
   - Develop and prioritize adaptation actions
   - Receive MVP designation
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   - Implement priority adaptation actions identified during the planning process

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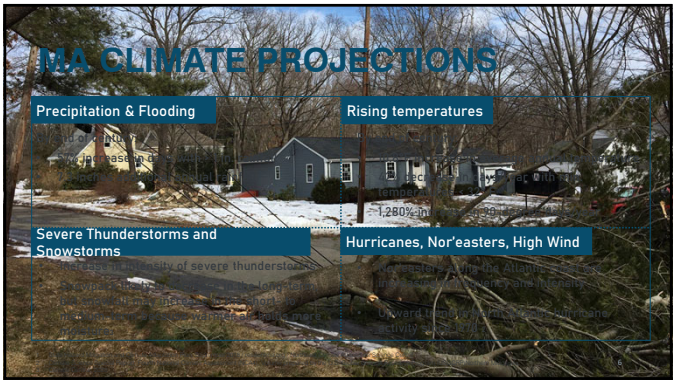

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CLIMATE HAZARDS

Rank	Options
1	Intense Precipitation and Flooding
2	Extreme Temperatures
3	Snow and Blizzards
4	Wind-Related Hazards

First choice ■ ■ ■ Last choice

7

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SOCIETAL FEATURES

Population	Reading	Massachusetts
2010	24,747	6,547,790
2018	25,337	6,902,149
Age		
Under 18 years	24%	20%
65+ years	16%	17%
Vulnerable Populations		
Limited English-speaking households	0.4%	6%
Persons in poverty	3%	10%
With a disability and <65	5%	8%

Source: American Community Survey, "Quick Facts." U.S. Census Bureau, 2018.

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SOCIETAL FEATURES

- Downtown District
- 2 Historic Districts
- Senior Center
- Youth Services
- Public Health Services
- Shelters
- Climate Change Commission
- Mission of Deeds and Food Pantry

Photo: Town of Reading, MA Facebook

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CLIMATE IMPACTS: SOCIETAL

- Increase in heat related illnesses
- Increase in allergens and asthma rates
- Business Closures
- Economic loss
- Private property damage
- Displacement of residents

10

10

What resources does your department or organization need to be more prepared?

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- Supplies or Equipment
- Additional guidance related to department operations, before, during, and after a hazard event
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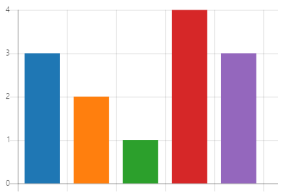

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ADAPTATION STRATEGIES

Survey results:

- Raise public awareness
- Create responsive citizens
- Transportation to shelters
- Air conditioning in schools
- Seniors and isolation
- Database of vulnerable populations

Photo by Weston & Sampson

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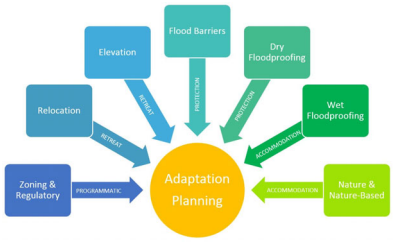
ADAPTATION STRATEGY TYPES



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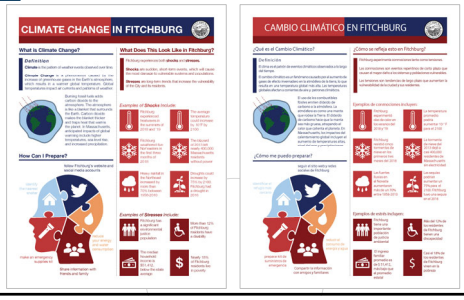
TRANSLATING MATERIALS



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MULTI-PRONGED APPROACH

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PUBLIC HEALTH

- Wellness checks
- Database of residents at risk of isolation
- Community Emergency Response Teams (CERT)
- Mobile markets
- Housing upgrades and investment

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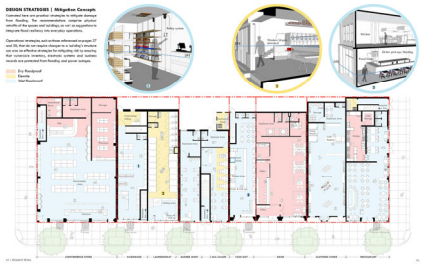
LOCAL BUSINESSES



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WORK WITH VOLUNTEERS

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SHELTERS, HEATING AND COOLING CENTERS

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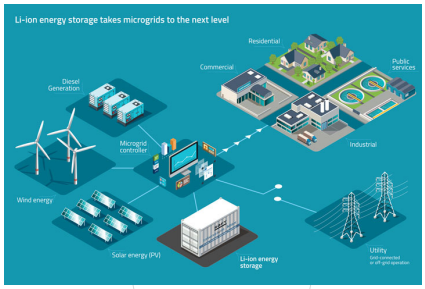
RENEWABLE ENERGY/MICRO-GRIDS



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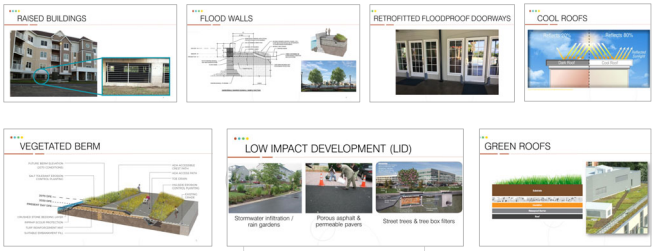
ADDITIONAL ADAPTATION STRATEGIES



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Example MVP Action Grant Projects

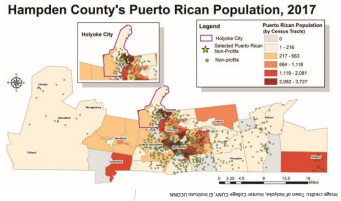
Detailed Vulnerability and Risk Assessment, Further Planning

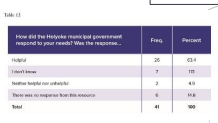
Holyoke

Conducted a detailed demographic analysis of individuals who arrived in Holyoke from Puerto Rico as a result of Hurricane Maria and develop recommendations for planning for future climate change migrants in Holyoke

Informational graphics from Holyoke's final report

Hampden County's Puerto Rican Population, 2017





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Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Intense Precipitation- Flooding - Drought	Extreme Temperatures	Snow and Blizzards	Wind-related Hazards (Nor'easters, Hurricanes, Severe Storms)	Priority H - M - L	Time Short Long Ongoing
Societal									
Barriers to Personal Resilience	N/A	N/A	V-social and emotional health, financial, S- work in areas to minimize flooding on roadways. Only one residential area that is not heavily impacted. S- Existing elder and human services (activated during hazard events)	Financial support for climate resilient improvements to residences	Education on how to be resilient - preparation, what individuals can do-- find other channels other than website to distribute information.	Promote existing counselling services.		Medium	Ongoing
Emergency Communications	Town critical infrastructure	Town	V- Town Hall and Library do not have generator S- Fire station does have a disel generator		Explore opportunities for solar power and battery back-up at critical facilities (town hall and library)	Need back up communications when power outages occur - using both generators and additional forms of communicating/fortying infrastructure	Study broadband network. Need inventory of generators across town.	High	Short - Ongoing
Mobility	1 bus route; MBTA commuter rail		S- Pleasant St. van Walkability in some areas is stronger than others. Adopted Smart Growth Zoning Reading Woods - required part of approval, there was a study on shuttle system Looking for a dedicated area for ride-share (north shore ride share) Securing bike shelters for downtown		Increase number of van access. Improve bike lane network (there is a bike plan).	Improve access to downtown through buses/shuttle system/bike lanes. PPP to fund. Shared rental bike stations and ride share partnerships.	Expand downtown zoning district to other areas (eastern gateway) to improve connectivity	High	Medium - Ongoing
Risk of Isolation	Schools - A/C is limited to administrative offices and RMHS auditorium has AC		S- Schools, Library (cooling), Senior Center (routinely a cooling center, has a backup generator, temporary cots) S- Database of frail seniors, lots of programming at Senior Center on hot days, been routinely calling S- full time social advocate and social work that work with seniors (100 contacts) S- set up food pantry and van delivery	Expand database beyond seniors. Need to develop a plan for hot days during COVID-19/isolation. New senior center should be design and outfitted with climate resilient features. Explore publc/private partnerships for cooling and heating stations (what about Burbank Y?)		Back up generators at heating and cooling centers.	Coordination of communications between municipal services.	High	Ongoing
Downtown District and Local Businesses			S - Downtown District Management Organization, ReImagine Reading, Art Box event (murals on utility boxes)	support local businesses through access to funding through loan loss reserve funds, etc. Cultivate a vibrant downtown activity culture for young families. Have more community events like a farmers market as an example to improve downtown business visits and				High-Medium	Short-Ongoing
Historic and Cultural Sites			V- damage to buildings s- group looking to establish a cultural district downtown			Assessment of historic structures and vulnerabilities		Medium	Medium

Reading MVP CRB Webinar Series
Day 2 – Societal Focus
Wednesday, May 20th
12 p.m. – 2 p.m.

Attendance

- Amanda Kohn – Weston & Sampson
- Steve Roy – Weston & Sampson
- Cassandra Albrecht – Weston & Sampson
- Core Team:
    - Jean Delios – Assistant Town Manager (Administration)
    - Andrew MacNichol – Staff Planner (Planning & Community Development)
    - Julie Mercier – Community Development Director (Planning & Community Development)
    - Jane Kinsella – Director of Public Works (Department of Public Works)
    - Chris Cole – Assistant Director of Public Works (Department of Public Works)
    - Ryan Percival – Town Engineer (Engineering Division)
    - Chuck Tirone – Conservation Administrator (Conservation Division)
- David Zeek – Climate Action Committee
- Hamid Jaffari – Director of Engineering & Operations (RMLD)
- Alex Rozycki – Senior Civil Engineer (Engineering Division)
- Martha Moore – Conservation Commission, Retired HS Teacher
- James Maughan – Zoning Board of Appeals (Previous member of Conservation Commission)
- Erin Schaeffer – Economic Development Director
- Virginia – Historical Commission
- Annika Scanlon – Vice Chair of Conservation
- Peter MacGown
- Tony D'Arezzo
- Kevin Furilla
- Janet Walsh
- Paul Jackson
- Laura
- Hillary
- 978-828-9625
- 617-823-5933

Discussion

- Risk Matrix
    - Barriers to Personal Resilience
        - Vulnerabilities
            - Do they have access to sump pumps and home infrastructure to assist during flooding?
            - Do they have access to leave neighborhoods to get to Senior Center or other Town buildings?
        - Ryan and Alex stated that in Willow Road they installed French drains in gutter line to help reduce impact to residents' buildings and sump pumps during flooding
        - Residents being overwhelmed
            - By snow, flooding
            - Educational programs could discuss "how bad can bad be" and how residents can handle 2-3 feet of snow, if they were normally preparing for 6-inches
                - Information can include having a first aid kit, having batteries, having flashlight
                - These materials can be published online
        - Internet access would be needed to access any online materials
        - Mental Health
            - Support for social and emotional health during challenging times
            - Falls under public health
                - Trained social workers on staff available to all age groups
                - Given the existing resources, believe that it is not much of a vulnerability
                - Work closely with schools and so are in touch with families
            - Often a collaboration between Public Health, Schools, Elder and Human Services, Public Safety
    - Emergency Communication
        - Establish a broadband capability could be beneficial for Town
            - Normally use phones to get information to residents
            - Getting information back from residents is important as well
        - Emergency communications during power outages – need a backup plan
            - Reading has a reliable system, but what about during a major disaster?
            - There are critical nodes and infrastructure identified, and those are at a priority
                - Good time to think about backup generators where there may not be any – have an inventory
        - Locations would be all of Town's critical infrastructure
            - RMLD wants to make sure this list is updated yearly
        - Town Hall does not have a backup generator
            - Believe library does not have a backup generator either

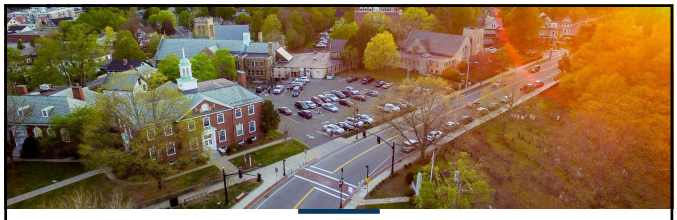
- Mobility
    - Senior Center has a van service that is normally operational
        - Currently not operating until further notice because of COVID-19
    - Adding more vans to the system would be beneficial
    - Walkability level?
        - Downtown is very walkable – lots can be accessed
            - Reading is a state model for smart growth
                - Smart Growth zoning – 10 year plan
                - Combining housing, transportation and walkability
                - Hundreds of housing units were built/being built downtown that are walking distance to commuter rail, businesses
                - Expanding smart growth district – currently includes all of downtown, and have a vision plan to extend this to Walkers Brook Drive (Eastern Gateway)
        - North or South ends of Town would have to walk down Main Street to access downtown and many businesses
            - Main Street is not the best/safest street to walk down
        - 6-7 out of 10
    - Limited public transportation – only one bus route in Town
    - MBTA Commuter Rail
        - Can be hard to access MBTA station from certain areas of Town because of limitations of bus system
    - Shuttle Bus systems?
        - Reduces traffic
        - Helpful in critical weather conditions
        - Can provide better access to commuter rail
        - Reading Woods – 424 unit development on Stoneham line
            - A requirement of approval was creating a shuttle bus service
                - Residents of development were not interested in the service, and so it did not come to fruition
        - Requirement for shuttle bus service will be considered for future developments
    - Partnering with rideshare companies (Uber, Lyft)
        - If Town's emergency response transportation is overwhelmed, the private rideshare company can be a backup
            - Town has an ongoing effort to have a dedicated area for drop-off from rideshares
            - Reading has meetings with North Shore ride share group and looking for them to expand into Reading
    - Rental Bike Stations
        - Reading has had a lot of conversations about this
        - Problem is that they want to make sure Town is safe for bike riding
            - Working on providing a safe pathway

- Town has bike plan with identified areas for biking
    - Places where might expect to see bike lanes as part of roadway are tricky
        - State Highway with 20,000 cars a day down Main Street (Route 28) makes it a safety concern
        - High speeds would be restrictive for many bikers
    - Main Street re-striping (in trial phase w/ temporary paint – "road diet") includes wider shoulders to make it safer for biking, for those who are comfortable biking along Main Street
    - Long term goal of bike plan is to create a bike lane to parallel existing commuter rail line
- Town is working with MAPC to get more bike shelters
- After COVID-19 where many folks are home and out walking/biking, there may become a bigger demand for bike infrastructure
    - May want to reconsider and look at these issues with a new lens given COVID-19 impacts

- Risk of Isolation
    - Includes those who are disabled
    - Includes newcomers to Reading, may not have social connections or knowledge of resources in Town
    - Senior Center is often a resource especially when there are high temperatures – it is often opened as a cooling center
        - This should be a strength
        - It has a backup generator
    - Have ability to set up temporary cots in the Senior Center if needed
    - Senior Center works with emergency services and keep a list of "frail" elders in Reading and will reach out to them during a time of extreme heat
        - Host events with popsicles, AC and put together flyers to advertise this
        - Andrew believes this list is likely voluntary
        - Staff works off database of thousands of names/phone numbers
            - Routinely going through the list and calling them during COVID-19 to make sure they are okay
                - 60+ population is on radar
    - Social Services staff (full-time nurse advocate and full-time social worker) work with a list of "frail" seniors, about 100 contacts
        - Highly specialized and trained medical and social worker folks have built relationship with these people
    - This coming summer, will need to be aware of COVID-19 impacts if using Senior Center is to be used as a cooling center
    - Library is a resource that is air conditioned in the summer
    - New Senior Center?
        - Should put together the resources that the Senior Center would need to have to make sure it can remain as a strength for the Town

        - COVID-19
            - Municipal buildings are closed until further notice
                - Can only reopen if meet protocols for COVID-19
            - Pandemic provides challenges to Town's resources in a similar way as climate change might
        - Senior van is being used to deliver emergency food bags
            - Have used Senior Center to create mini food pantry as a backup
        - Coordination on connecting residents to the correct resource
            - Emergency dispatch and municipal services (Senior Center)
        - Public/private partnerships for heating/cooling stations?
            - Burbank YMCA
    - Downtown District and Local Businesses
        - Downtown District Management Organization & Reimagine Reading
            - Reading sent out a public survey about farmer's markets, beer gardens, events
                - Research shows that these events gives community a better sense of place and builds community resilience
            - Reading has Art Box event – painting of murals on utility boxes
                - Example of Town working with community, building communication
        - Andrew is looking into climate-related grants for small businesses
        - Haven Streetscape project
            - Ongoing project over the next several years
        - Eastern Gateway project (Walkers Brook/Ash Street)
    - Historic and Cultural Sites
        - Assessment of structures to see if they can withstand large snow capacity on roof or flooding, etc.
        - Historic Commissions have never really taken a lot of time to understand how climate change may impact historic impacts of Town
        - Historic structures themselves can have impacts on climate change – flooding damage, heat
            - Hard to determine the societal impacts of these
        - There is a study/group working to develop a cultural district downtown
    - Birch Meadow plan – recreational area
        - Should incorporate climate change considerations into this plan
    - Prioritization
        - Barriers to Personal Resilience
            - Medium
            - Ongoing
        - Emergency Communications
            - High
            - Short/Ongoing
            - Can be considered even without MVP Grants – i.e. the coordination, creating an inventory, etc.
        - Mobility

        - High
        - Medium/Ongoing
- Risk of Isolation
    - High
    - Ongoing
- Downtown District and Local Businesses
    - High/Medium
    - Ongoing
- Historic and Cultural Sites
    - Medium
    - Midterm



TOWN OF READING

Community Resilience Building Workshop - Environment

Weston & Sampson — Photo: Town of Reading Twitter — 1

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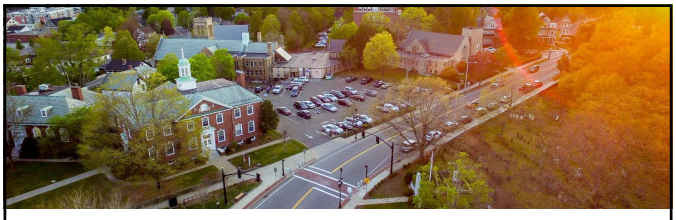

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Photo: Reading Facebook

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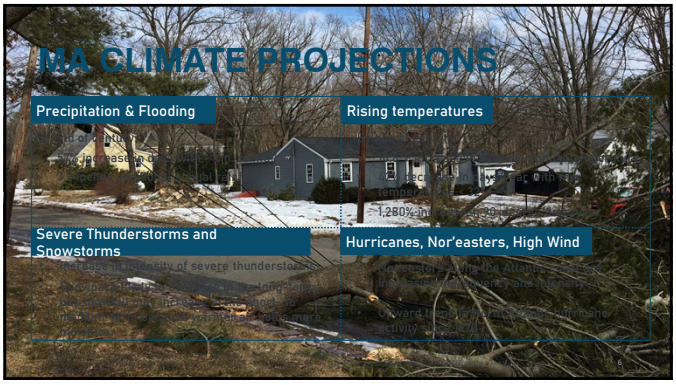

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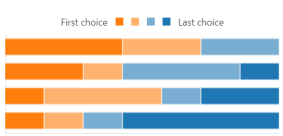

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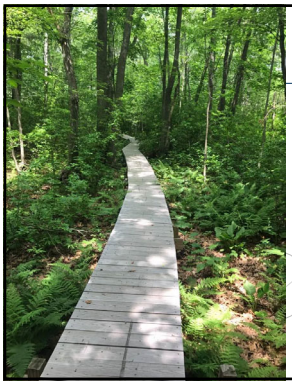

ENVIRONMENTAL FEATURES

- 3 watershed – Aberjona, Saugus, and Ipswich Rivers
- Large swamps and marshes provide flood control
- Town Forest
- Parks
- Tree canopy
- Development and Land Use

Photo: Town of Reading, MA Facebook
Town of Reading, Hazard Mitigation Plan, 2017

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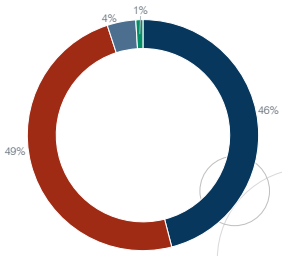
OPEN SPACE



- Residential
- Forest, Open Space, Wetland, Agriculture
- Commercial and Industrial
- Other

Weston & Sampson
Town of Reading, MA Hazard Mitigation Plan, 2017

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CLIMATE IMPACTS: ENVIRONMENTAL

Tree and forest damage

Drought weakens tree root systems
High winds and snowstorms cause damage
Brush fires clear forest canopy
Flooding may cause vegetation to die

Increase in pollution

Heavy rainfall can cause increase of pollutant loads
Increase in harmful algal blooms

Life Cycles

Migrating plant and animal species
Increase in vector-borne diseases
Difficult for native species to thrive

10

10

What resources does your department or organization need to be more prepared?

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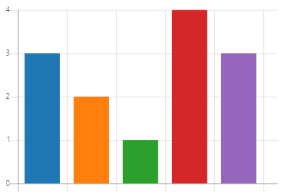

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ADAPTATION STRATEGIES

Survey results:
- Protecting open space
- Increasing low impact development planning and engineering

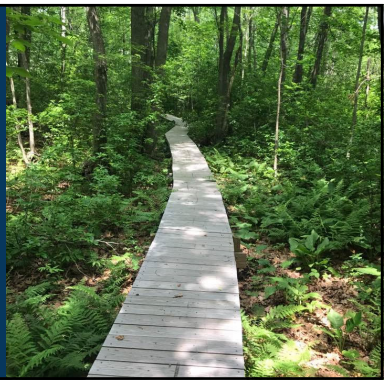

Photo: Town of Reading Facebook

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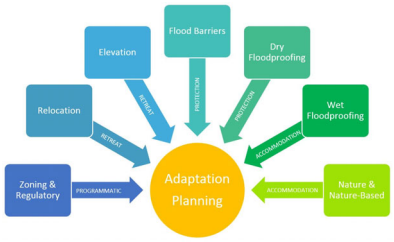
ADAPTATION STRATEGY TYPES



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RE-EVALUATE LOCAL REGULATIONS & POLICIES

- Aquifer Protection District
- Floodplain Overlay District
- Zoning Bylaw
- Wetlands Protection Regulations
- Site Plan requirements
- Stormwater management bylaw and regulations
- Subdivision regulations and review
- Massachusetts State Building Code
- Outdoor burning permits
- Downtown Smart Growth Design Guidelines
- South Main Street Design Guidelines

Weston & Sampson

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ADOPT NEW LOCAL REGULATIONS & POLICIES

GREEN ROOFS

COOL ROOFS

REDUCE IMPERVIOUS AREAS

LOW IMPACT DEVELOPMENT (LID)

TREE PROTECTION

GROUNDWATER PROTECTION

WATER SUPPLY PROTECTION

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WETLAND RESTORATION

Wetlands in Troy, New York

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LAND AQUISITION

As part of an MVP Action Grant, Mattapoisett purchased 120 acres of forest, streams, freshwater wetlands, and coastal salt marsh as conservation land to prevent development in vulnerable areas

Image from EOEAA, 2019

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REMEDIATE CONTAMINATED SITES

Medfield State Hospital, Remediation along the Charles River

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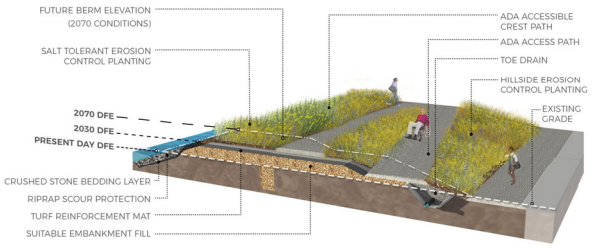
VEGETATED BERM



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MULTI-PURPOSE FLOOD STORAGE

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STORMWATER DETENTION & RETENTION

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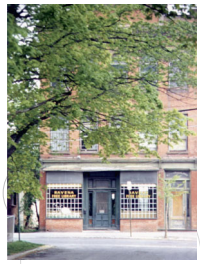
TREE OR FOREST MANAGEMENT



Tree species, placement, and maintenance recommendations by W&S for Ravena, NY

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BANK RESTORATION & STABILIZATION

Live Crib Wall | Vegetated Retaining Wall | Joint Planting | Gabions

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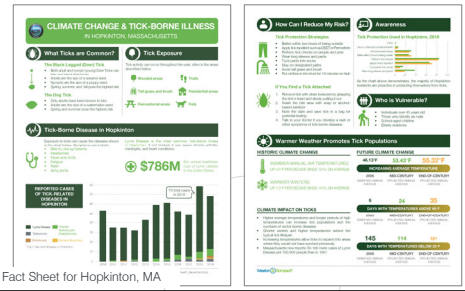
PUBLIC EDUCATION & OUTREACH



Tick Education Fact Sheet for Hopkinton, MA

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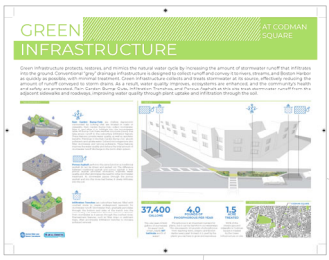
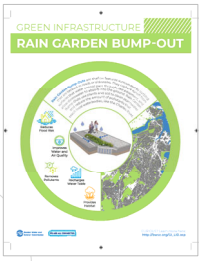
EDUCATIONAL SIGNAGE





Green infrastructure signage by W&S for the Boston Water & Sewer Commission

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REMOVAL OF INVASIVE SPECIES

Invasive Japanese Knotweed in Arlington, MA

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Community Resilience Building Risk Matrix

www.CommunityResilienceBuilding.org

H-**M**-**L** priority for action over the **S**hort or **L**ong term (and **O**ngoing)
V = Vulnerability **S** = Strength

Top Priority Hazards (tornado, floods, wildfire, hurricanes, earthquake, drought, sea level rise, heat wave, etc.)

Features	Location	Ownership	V or S	Intense Precipitation- Flooding - Drought	Extreme Temperatures	Snow and Blizzards	Wind-related Hazards (Nor'easters, Hurricanes, Severe Storms)	Priority **H** - **M** - **L**	Time **S**hort **L**ong **O**ngoing
Environmental									
Rivers and Streams	Walkers Brook, Main St.	N/A	V- erosion (Walkers Brook, behind Starbuck on Main Street, Main St. and Cross- lots of undercutting, Pine Vale has a lot of sediment in stream channel) and sedimentation, causes flooding in some areas and causes property damage S- Sturgis Park area was worked on (might need more work, but bank has been stabilized, rip rap)	Stream stabilization and restoration in areas of erosion. Instream to divert flood and channels. Increase nature-based stormwater to reduce inflow during large storms. Land acquistion to complete the work- identify areas where this would be strategic. Imagination Station and fields could be used for storage. Remove invasive species along stream bank near imagination station)				High	Short-Ongoing
Wetlands (swamp and marshes included)	specific areas	N/A	S- conservation commission has done a good job as preserving. V- need to find areas where additional storage would not make flooding of basements in area, high seasonal water table	update regulations (see below). Opportunity to purchase some of the buffer zone. Find solutions that do not burden residents, but resolves flooding on their area.				Medium-High	Medium - Ongoing
Bylaws and Regulations	Stormwater regs, wetland bylaw	town/ state	S- stormwater regs have been updated recently - hope leads to more creative open space on parcels and more infiltration. S- wetland bylaw (conservation commission enforces) - roof runoff is infiltrated for that structure	New structures go through an analysis to look at climate resilience (no requirements to take action)- increase standards of new development and redevelopment. Increase buffer zone in the wetland bylaw. Need to updated floodplain overlay district with climate resilience.				High	Short-Medium
Parks and Forests	Memorial Park, Birch Meadow, Imagination Station, etc.		S- recent forest management (pilot) High school/tennis courts- playgrounds have some shade trees, baseball field near pleasant st we planted 20 treees. Several trees planted at another park.	Incorporate climate change into recreational facilities and parks planning and design. Explore the options of using town-owned land (newly acquired parcel) for infiltration. Expand forest management. comp. forest management plan.	Prioritize areas for green infrastructure (field house parking lot, birch meadow, others that were mentioned see notes). Align with Birch Meadow Master Plan.	Wind damage in Memorial Park, lost lots of trees. Harrison ave has lots of ash trees. Need protection in parking areas to stop parking that damages		Medium	Medium - Long
Development Patterns	townwide	N/A	S -have conversations with developers early on. Discussion early on expectations, visions, and then goes to developent review team and to other boards/commissions. There are some design standards that are provided. been seeing a shared driveways become more popular on large parcels that could be 2. V -PUD and PR can be underutilized - must go to town meeting	Focusing and incentivizing development in economic development zones. Higher density development near train and developed areas. Cluster development for more open space. Build consensus around smart growth and using information about costs, co-benefits of this type of development. Outer edges --include sensitive areas and wetlands -- asks developments to put these areas into conservation deeds and connect to existing forests/natural areas-- need public benefits to be a part of the conversation for waivers. Subdivision regulations need updated - more LID and other updates that need to be made. Guidebook/guidelines of what a proposal should look like.				Medium	Mid-Ongoing
Street Trees/Tree Canopy	Townwide	town, private	V- pine trees come down quite often and wipe out infrastructure. Bradford pear is weak. Emerald ash boarer was in North Reading (not in Reading yet). Will need to remove Ash trees. Aging norway maples (80% of call after wind storms) - red and sugar maples are stronger. Droughts have impacted the trees too. Some streets have been more impacted than others. S- new technology to allow better growth.	Replanting and adding shade plantings with diverse species-- possibly at Memorial Park. Survey/ map of street trees to help manage ash removal and replanting --full inventory of the town (location and type). Use small species under utility wires. Guidance for looking at how planting will flourish in the long run and impact surrounding built environment. Looking for where gas leaks (support ongoing audit) are impacting tree and remediate impact - Salem as an example. Plant trees in UHI areas (general way and parking areas near train station, large parking areas on WBD). Plant large shrub species too.				High	Short

Town of Reading
Meeting Minutes

2016-09-22 LAG

Board - Committee - Commission - Council:

Date: 2020-05-21 Time: 12:00 PM

Building: NA Location: Zoom Online Forum

Present: Amanda Kohn, Cassandra Albrecht, Steve Roy, Julie Mercier, Charles Tirone, Jean Delios, Andrew MacNichol, Ryan Percival, Alex Rozycki, Laura Vlasuk, Chris Cole, Jane Kinsella, Jamie Maughn, Annika Scanlon, Mike Flynn, Martha Moore, Mike Hannford, David Zeek, Hillary Mateev, Virginia Adams

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Reading MVP – Community Resilience Building Workshop: Environmental

Mr. Maughn stated that there are extreme peaks of high volume and low volume in streams and the Town must work to 'flatten the hydrograph' and also focus on natural/in-stream rehabilitation instead of hardscape fixes. Areas of concern should include Willow Street, Walkers Brook, Pinevale Rd, Cross St, Track Rd, Sturgis Park

Mr. Tirone stated Deep stream channels will always have issues and any time you can stabilize you should.

Mr. Percival stated some areas exceed storage capacity and makes dry areas wet.

Mr. Roy asked is the goal is to create more storage. Mr. Percival: stated affirmatively and to mitigate downstream flooding w/ upstream storage. Land is not always available though and easements can present issues. Mr. Rozycki stated the engineering department always looks to add natural features.

Mr. Rozycki stated there may be an opportunity at the Birch Meadow complex for underground storage.

Mr. Maughn stated acquisition of flood land would be a good thing for the Town to do.

Ms. Scanlon opined increasing building standards for green construction would be beneficial.

Ms. Moore asked if there was storage capacity at the local ice rink. Mr. Percival thought it was a good thought and would look into it.

Mr. Percival stated the MS4 permit requirements lead to better building standards including storage and treatment on site.

Mr. Tirone stated the Conservation Commission enforces the capture of runoff.

Mr. Hannaford stated an Ash Tree 'invasion' is likely and removal of the species will be needed. He added that aging Maple Trees are vulnerable to wind storms. Mr. Roy asked if there was a formal plan or if one was needed. Mr. Hannaford responded that one is needed. Mr. Percival opined a full town inventory would be beneficial as power lines and roads can be impacted as well.

Mr. Hannaford stated street trees are more vulnerable than park trees. Mr. Percival stated that tree well structuring is improving and should be considered on every new development. He added addressing locations and plantings in the planning process would be good.

Mr. Percival stated there was recently thinning done at the Town Forest. Mr. Roy asked if there was any revenue gain. Mr. Maughn stated there was a small amount. Mr. Cole clarified no revenue was gained.

Mr. Zeek stated a gas leaks audit will identify trees in jeopardy.

Mr. Rozycki stated Imagination Station storage could be upgraded. Mr. Percival stated the area is being evaluated extensively. Ms. Scanlon stated Memorial Park should be considered as well in order to slow down discharge to Walkers Brook. She added that Birch Meadow has a high water table.

Mr. Zeek asked about next steps. Ms. Kohn stated that a Public Listening Session would be held in two weeks to gather final comments on the priorities gathered. She continued that information on such will be provided.

Meeting end.

APPENDIX C

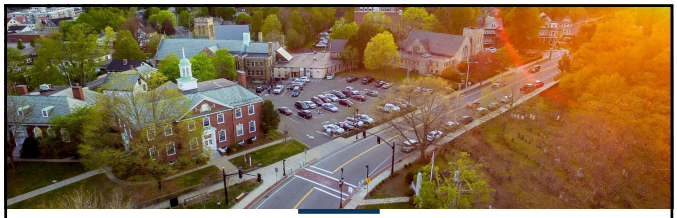
Public Listening Session Materials

Municipal Vulnerability Preparedness Planning Grant

Listening Session
Thursday, June 11, 2020
5:00 pm – 6:30 pm

Zoom Meeting

Municipal Vulnerability Preparedness (MVP) Program Overview	5 minutes
Climate Change in Reading	10 minutes
Vulnerabilities in Reading	10 minutes
Strengths in Reading	10 minutes
Priorities in Reading	20 minutes
Wrap-up	5 minutes



TOWN OF READING

Municipal Vulnerability Preparedness (MVP)
Listening Session

June 11, 2020

Weston & Sampson Photo: Town of Reading Twitter 1

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WELCOME FROM WESTON & SAMPSON


AMANDA KOHN


STEVE ROY


CASSANDRA ALBRECHT

Weston & Sampson Photo: Town of Reading Twitter 2

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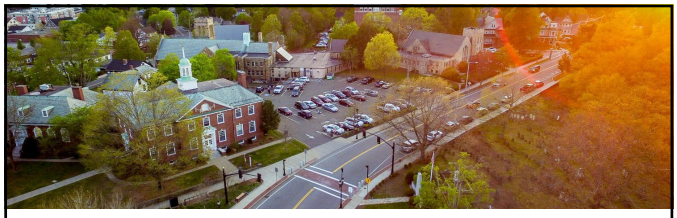

WELCOME PARTICIPANTS

Weston & Sampson Photo: Town of Reading Twitter 3

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LOGISTICS

- This webinar is being **recorded**
- Overview of Zoom
  - Tell us what your favorite thing about Reading is **in the chat!**
  - **Raise hand function**
  - **Mute and unmute**
- The webinar is paired with an **online form**
  - Submit questions or comments anonymously (or not!) after the presentation

https://tinyurl.com/MVPReading2020

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WEBINAR OUTLINE

- Overview of MVP
- Overview of Climate Change
- Strengths and Vulnerabilities
- Priority Action Items
- Next Steps
  - Tell us about your climate adaptation priorities by taking our **online survey!**

Photo: Reading Facebook

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MVP OVERVIEW

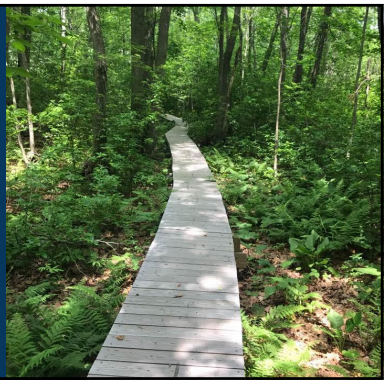

Photo: Reading Facebook

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MVP PROGRAM PRINCIPALS

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MVP PROCESS

1. **MVP Planning Grant**
   - Define climate hazards
   - Identify community vulnerabilities and strengths
   - Develop and prioritize adaptation actions
   - Receive MVP designation
2. **MVP Action Grant**
   - Implement priority adaptation actions identified during the planning process

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PROJECT OVERVIEW

1. Review Plans
2. Convene the Core Team → Met earlier this year
3. Critical Facilities List → Sent in pre-workshop materials
4. Hazards Map
5. Community Resilience Building Workshop → 3 webinars
6. Finalize Priorities
7. Public Listening Session → Online live and recorded
8. Report → Due to EEA on June 30th

Weston & Sampson

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MVP ACTION GRANTS PROJECT TYPES

- **Vulnerability and Risk Assessment**
  - Community Outreach and Education
  - Local Bylaws, Ordinances, Plans, and Other Management Measures
  - Mosquito Control Districts
- **Redesigns and Retrofits**
  - Subsidized Low-Income Housing Resilience Strategies
  - Chemical Safety
  - Energy Resilience
- **Nature-Based Solutions**
  - Land Acquisition for Resilience
  - Ecological Restoration and Habitat Management to Increase Resiliency
  - Flood Protection, Drought Mitigation, Water Quality, and Water Infiltration Techniques
  - Infrastructure and Technology to Extreme Heat and Poor Air Quality
  - Reduce Vulnerability to other Climate Hazards

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COMMUNITY RESILIENCE BUILDING WORKSHOP

Focused on **Four Hazards**

Identified:
- Vulnerabilities
- Strengths
- Priority Action Items

Across Three Categories:
- Infrastructure
- Society
- Environment

Weston & Sampson

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Any questions?

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CLIMATE HAZARDS

Photo: Reading Facebook

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TOP HAZARDS IN READING

- Extreme Temperatures
- Snow and Blizzards
- Extreme Precipitation and Flooding
- Hurricanes, Nor'easters, High Wind

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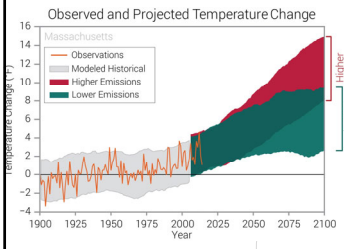
EXTREME TEMPERATURES



Since 1970, annual temperatures in the Northeast have been warming at an average rate of 0.5°F per decade

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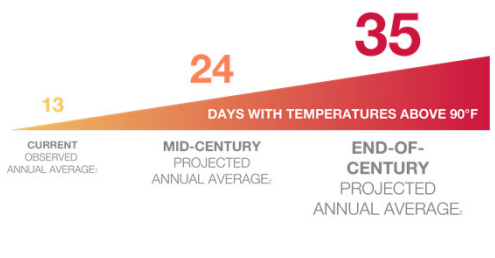
EXTREME TEMPERATURES
IN READING, MA



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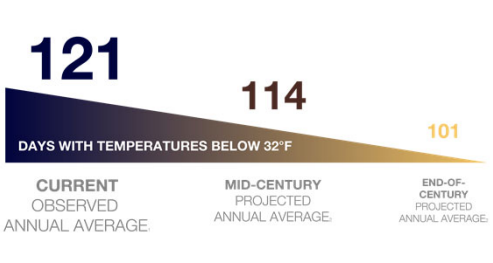
EXTREME TEMPERATURES
IN READING, MA



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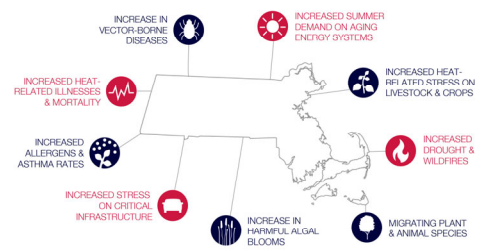
IMPACTS OF RISING TEMPERATURES



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CHANGES IN PRECIPITATION

MORE **INTENSE & FREQUENT** EXTREME RAIN EVENTS

PRECIPITATION DURING **HEAVY EVENTS** IN THE NORTHEAST **INCREASED BY MORE THAN 70%** BETWEEN 1958-2010

HEAVY EVENTS ARE DEFINED AS THE HEAVIEST 1% OF ALL DAILY EVENTS

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Changes in Precipitation." Massachusetts Climate Change Clearinghouse. Resilientma.org/changes/changes-in-precipitation

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EXTREME PRECIPITATION

1-2
Current average number of days with precipitation over 2"

8%
Increase in extreme precipitation events by midcentury

13%
Increase in extreme precipitation events by 2100

Extreme precipitation events are defined as events with greater than 2" of rain per day

Source: Executive Office of Energy and Environmental Affairs, Adaptation Advisory Committee. 2011. "Massachusetts Climate Change Adaptation Report," 19.

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FLOOD PRONE AREAS

- **Southern part of town**, generally small in scale and clustered
- **2 repetitive loss sites**
- **Sunnyside and Fairview Avenues** – undersized pipes
- **New Crossing at DPW Garage** – undersized culvert
- **Track Road at Line Road** – 3 bridges that impede flow, location of beaver blockage
- **South Main Street** – storm drain line needs to be replaced
- **Brook and Ash Streets** – drainage ditch issues and beaver blockages
- **Lowell Street at Intervale Terrace** – drainage issue
- **Willow Street/Austin Prep** – drainage issue
- **Oak Ridge/Cherry Lane** – drainage issue
- **Haverhill Street at the Town line** – undersized culvert
- **Cul-de-sac at Warren Avenue**

Reading Hazard Mitigation Plan. 2017. and Core Team Input

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IMPACTS OF CHANGING PRECIPITATION

HIGHER AVERAGE ANNUAL PRECIPITATION
INCREASED BY ABOUT 10% IN THE NORTHEAST INTHE LAST 50 YEARS

- WETTER SPRINGS DELAY PLANTING & REDUCE YIELD
- DECREASED SUMMER PRECIPITATION COULD INCREASE EPISODIC DROUGHTS
- NEW STRESSES FOR ECOSYSTEMS
- DROUGHTS CAN WEAKEN TREE ROOT SYSTEMS
- INCREASED ROAD POLLUTANTS IN WATERBODIES
- CROP DAMAGE FROM INTENSE RAINFALL
- DROUGHTS CAN REDUCE LOCAL WATER SUPPLY

Massachusetts Executive Office of Energy & Environmental Affairs. 2019. "Changes in Precipitation." Massachusetts Climate Change Clearinghouse. http://www.resilientma.org/changes/changes-in-precipitation

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WINTER STORMS

- The blizzard of 2013 left nearly **400,000 Massachusetts residents without power.**[1]
- "Heavy blizzards are among the **most costly and disruptive** weather events for Massachusetts communities."[2]
- Snowpack likely to **decrease in the long-term**, but snowfall may **increase in the short- to medium-term** because warmer air holds more moisture.[3]

Transit (MBTA) closure power outages
restricted roadway access
school closure
ban on-street parking

1. Resilient MA Climate Change Clearinghouse for the Commonwealth. "Extreme Weather." 2017
2. Massachusetts State Hazard Mitigation and Adaptation Plan." 2018. P4-22b).
3. Climate Central. 2020
Photo: Town of Reading, MA Facebook

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HURRICANES AND NOR'EASTERS

Upward trend in North Atlantic hurricane activity since 1970

Increase in intensity of severe thunderstorms

Nor'easters along the Atlantic coast are increasing in frequency and intensity

Source: Climate Science Special Report, Fourth National Climate Assessment (NCA4, Volume prepared by the U.S. Global Change Research Program (USGCRP)/Northern Middlesex

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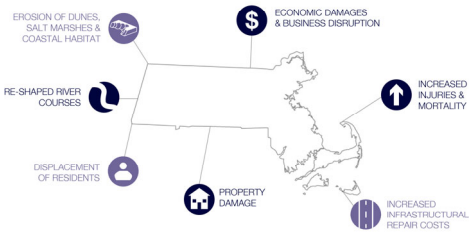
IMPACTS OF EXTREME WEATHER

STORMS ARE BECOMING MORE INTENSE AND DAMAGING



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What hazards most concern you?

What memories do you have of climate impacts?

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STRENGTHS & VULNERABILITIES

Photo: Reading Fire Department Twitter

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INFRASTRUCTURE

Strengths

- Massachusetts Water Resource Authority (MWRA) water supply
- Reading Municipal Light Department (RMLD) provides service as a local utility
- Two Solar Choice projects
- Roadways
- Emergency Management Plan for cooling centers and energy efficiency upgrades
- Capital plan to upgrade all municipal wastewater pump stations
- Wastewater system evaluation in economic development areas
- Infiltration and Inflow
- Stormwater Enterprise Fund
- Private development is encouraged to include Low Impact Development (LID)
- Small bridge replacements and upgrades; Track Road bridge replacement is underway

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INFRASTRUCTURE

Vulnerabilities

- Snowstorms and high wind can lead to downed power lines and unavailable power
- Extreme temperatures can lead to override of power system capacity
- Water distribution system is aging
- Willow Street, Walkers Brook Drive and Main Street (Route 28) are susceptible to flooding
- Aging wastewater pump stations that have not been upgraded yet do not have backup power
- Natural gas leaks
- Culverts are undersized and made of poor, outdated materials
- Drinking water booster pump stations are at risk of flooding
- LID in private developments is not always properly maintained
- Road access if flooded, blocked, or washed out, especially on dead-ends and cul-de-sacs

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ENVIRONMENT

Strengths

- Parks in general and providing a buffer to flooding
- Wetlands are well preserved through enforcement of the Wetlands Bylaws
- Stormwater regulations have been recently updated
- Forest management pilot project
- Private developments are given design standards and go through many reviews
- Shared driveways on large parcels
- MS4 permit building standards increased; will improve storage and treatment on-site and increase green spaces

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ENVIRONMENT

Vulnerabilities

- Erosion and sedimentation causing flooding in various areas
- Basement flooding from high groundwater table
- Availability of land is limited, and easements can present issues
- Trees often fall and damage infrastructure
- Invasive species
- Emerald Ash Borer
- Aging Norway Maple and pine trees
- Planning unit development is underutilized

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SOCIETY

Strengths

- Collaboration between Public Health, Schools, Elder & Human Services and Public Safety departments (i.e. database of frail residents, advocates, food pantry, van service)
- Senior Center is a cooling center and has temporary cots and a backup generator
- Outreach and events for elderly and vulnerable community members
- Downtown District Management Organization and Reimagine Reading
- Smart Growth zoning plan for downtown
- Private developments are encouraged to provide shuttle bus services
- Town has a bike plan looking at improving bike infrastructure
- Historic sites and looking into establishing a cultural district

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SOCIETY

Vulnerabilities

- Emergency communication system is at risk during power outages
- Town Hall and library do not have backup power
- Main Street is not walkable outside downtown area and has heavy traffic traveling at high speeds (currently undergoing a road diet pilot)
- Only two (136 and 137) bus routes in Reading, lacking in east-west connections
- Senior Center and municipal buildings are closed due to COVID-19
- Financial barriers to building personal resilience

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What do you think about these vulnerabilities and strengths?

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HIGH PRIORITIES: INFRASTRUCTURE

- Educate residents about energy conservation and off-peak energy usage
- Leverage rebate and incentive programs to promote renewable energy and energy efficiency
- Identify critical facilities in Town and whether they have a backup generator or not
- Invest in solar carports and/or solar roofs at critical facilities
- Design and construct flood storage and stormwater infiltration projects, such as those identified by the Mystic River Watershed Association (MyRWA)
- Incorporate green infrastructure, shade trees and other resilience features into economic development zones
- Develop a planting guide that promotes diversity and species that could be planted along roadways and near power lines

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HIGH PRIORITIES: INFRASTRUCTURE

- Update development and redevelopment regulations to require stormwater systems to consider climate projected design storms
- Update culverts and municipally-owned stormwater infrastructure using climate projections, and include co-benefits such as wildlife habitat and passage
- Pilot LID designs to retrofit existing catch basins
- Re-paint "Do Not Dump" on storm drains
- Develop training and funding to support LID and green infrastructure maintenance
- Elevate or protect drinking water booster stations from flooding
- Upgrade wastewater pump stations with backup power

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HIGH PRIORITIES: ENVIRONMENT

- Implement stream stabilization and restoration in areas of erosion; consider natural stream-based restoration over hardscape in-stream stabilization
- Increase nature-based stormwater to reduce inflow during large storms
- Identify areas for strategic land acquisition
- Remove invasive species along stream bank near Imagination Station
- Increase climate resilience standards for new development and redevelopment
- Increase the buffer zone in the Wetlands Bylaw
- Investigate opportunities for purchasing some of the buffer zone
- Research tree box filters that allow for better tree growth
- Explore the options of using Town-owned land for infiltration and storage (Birch Meadow, Town Ice Rink)

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HIGH PRIORITIES: ENVIRONMENT

- Find solutions to reduce flooding that do not burden residents
- Update the floodplain overlay district to consider climate resilience
- Replant and add shade plantings with diverse species at Memorial Park
- Create a map of street trees to help manage ash tree removal and replanting
- Replant small trees under utility wires
- Look for guidance on how planting will flourish in the long run and will impact the built environment
- Identify locations where gas leaks are impacting trees and remediate the impact
- Plant trees in urban heat island areas, such as the parking areas near the MBTA Commuter Rail station and on Walkers Brook Drive

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HIGH PRIORITIES: SOCIETY

- Study if a municipal broadband network to improve internet connection would be feasible
- Develop backup communication strategies for when power outages occur
- Explore opportunities for solar power and batter backup at critical facilities
- Increase number of vans for Senior Center van service
- Develop a dedicated area for drop-off from rideshares
- Explore opportunities to join local ridesharing groups
- Improve bike lane network through the development of Town's bike plan
- Improve access to downtown through buses/shuttle systems/bike lanes
- Support local businesses through access to funding (small business loans) to improve resilience

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HIGH PRIORITIES: SOCIETY

- Explore opportunities for public-private partnerships (PPP) to provide additional heating/cooling stations
- Expand downtown Smart Growth zoning to other areas of Town to improve connectivity
- Expand database of residents
- Develop a plan for extreme heat during COVID-19
- Look for opportunities surrounding a new Senior Center with climate resilient features and capacity to function as a cooling center
- Cultivate a vibrant downtown activity culture for young families

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What project idea do you think should be a high priority?

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We want to understand your priorities

Comment on the webinar and submit your questions through an online!

https://tinyurl.com/MVPReading2020

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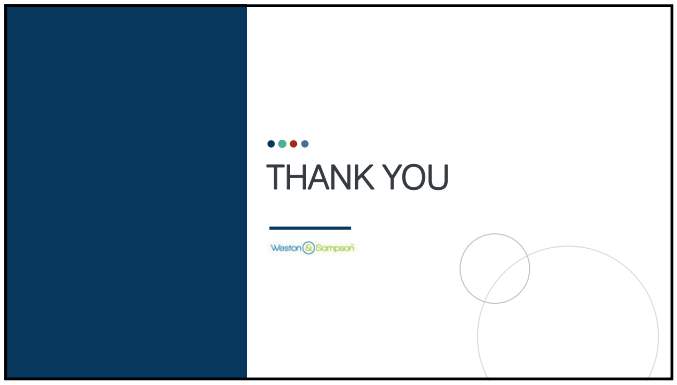

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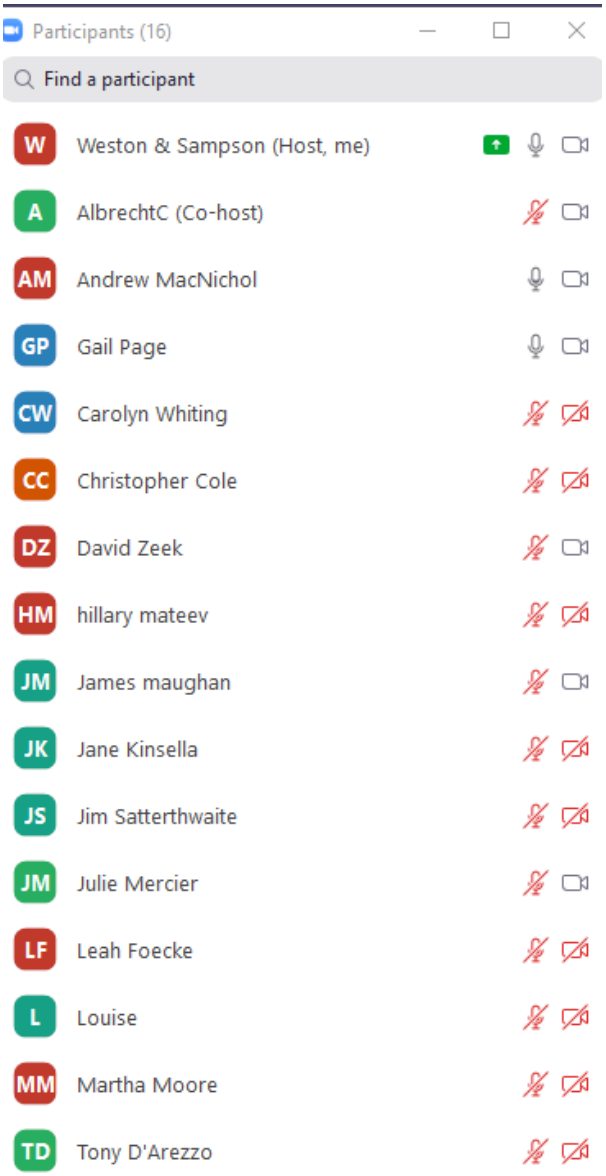
Reading Public Engagement

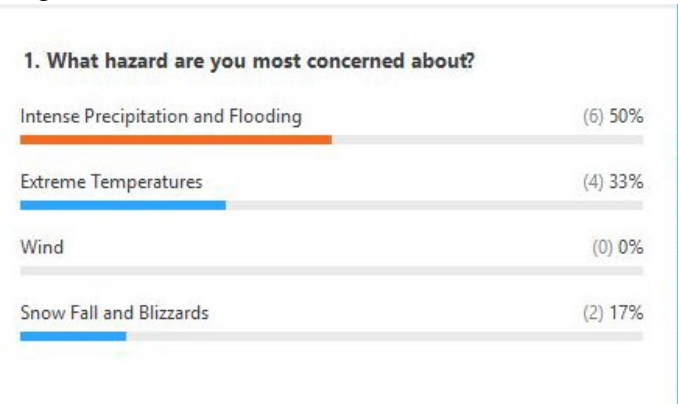
Reading MVP Listening Session
Thursday, June 11th
5 p.m. – 6:30 p.m.

Attendee List



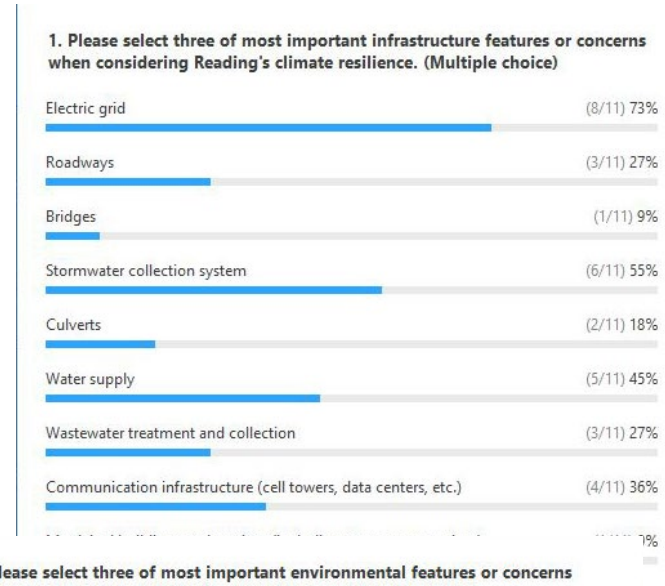
Discussion

- Extreme Temperatures
  - What was the baseline temperature in 1970, that we have seen an increase of 0.5 degrees Fahrenheit per decade from?
  - The observed and projected temperature change is shown due to lower emissions versus higher emissions – are these global emissions?
- Poll 1 – Most concerning hazard
  - Intense Precipitation and Flooding – 6/12 votes
  - Extreme Temperatures – 4/12 votes
  - Snow Fall and Blizzards – 2/12 votes

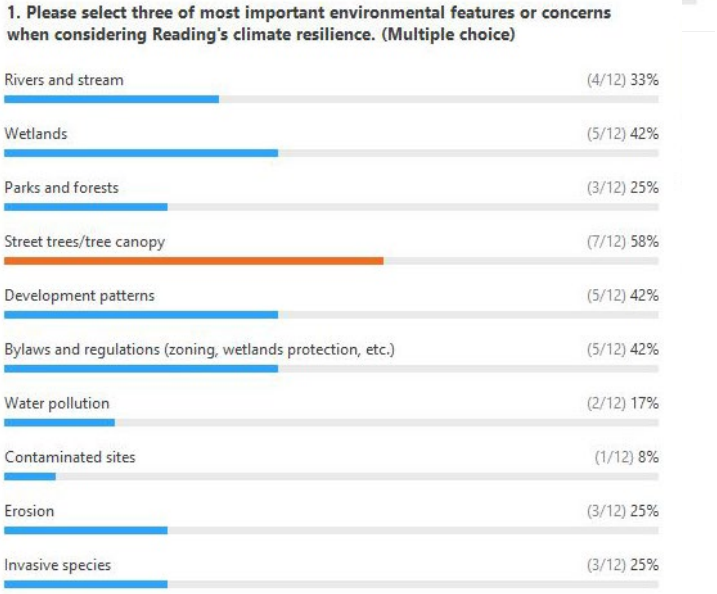


- Infrastructure Strengths – Highlighted
  - MWRA
  - RMLD – Local, reduces response times, tree management
  - Stormwater Enterprise Fund
- Vulnerabilities – Highlighted
  - Storms/High winds can impact power system
  - Culverts that are undersized
  - Aging WW pump stations (but Town is working through replacing/upgrading these)
- Poll 2 – Three of the most important infrastructure features or concerns when considering Reading's climate resilience
  - Electric Grid – Most important
    - Heat homes, power homes
  - Stormwater collection system
    - "Don't want that backing up anywhere"
  - Water Supply
    - Surprised at this rising so high on the list of concerns
    - MWRA, yes, but there is no WTP
    - Wells are offline, not in use, not intended to be used
  - Communication infrastructure (cell towers, data centers)

        - Keep people up to date
- Environment Strengths – Highlighted
    - Parks can provide resiliency for public health (being active), but also buffers for flooding
    - Wetlands are well protected/preserved
    - Private developers have been proactive in nature-based solutions
- Vulnerabilities
    - Invasive species
    - Certain trees tend to be culprits for falling as they age
    - Want to find a boundary between mitigating flooding and creating worse problems for residents

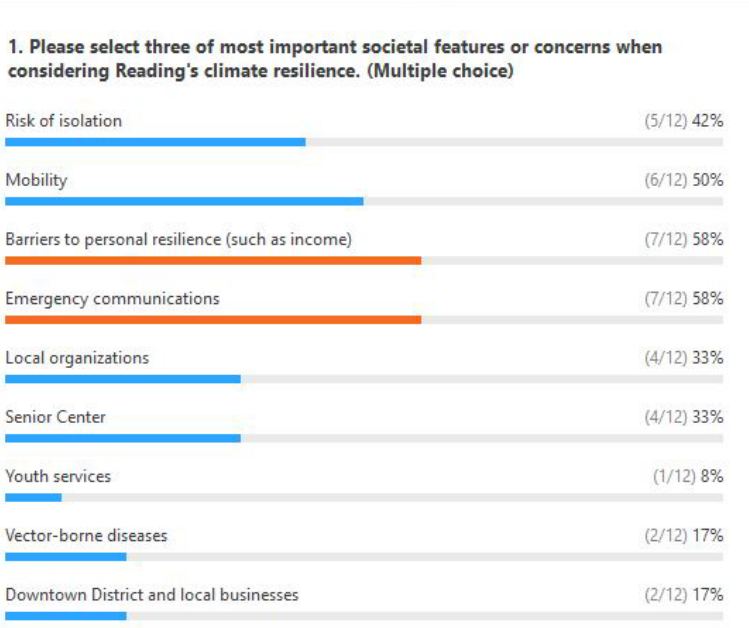


- Poll 3 – Three of the most important environmental features or concerns when considering Reading's climate resilience
    - Street trees/tree canopy
    - Wetlands/development patterns/bylaws & regulations



- Society Strengths – Highlighted
    - Collaboration between existing departments and services that are already provided
        - Van service
        - Cooling center
        - Database of frail seniors
        - Outreach to elderly residents
    - Downtown District Management
    - Town has several planning processes, including bike plan
- Vulnerabilities
    - Critical facilities having risk with no backup power
    - How can we mitigate risks with multiple hazards…climate change and COVID-19

- Poll 4 – Three of the most important societal features or concerns when considering Reading's climate resilience
    - Barriers to personal resilience/emergency communications
    - Mobility
    - Risk of isolation



- High Priorities
    - Infrastructure
    - Environment
        - Love focus on nature-based solutions and considerations…nature is a great teacher
        - Workshops provided good recommendations to focus less on hardscape fixes and to focus on more green and natural fixes when applicable
    - Society
        - Does everyone have access to the internet? Would a municipal broadband network be helpful and/or feasible?
        - Can the Town find small business loans to help small businesses improve their own climate resilience?
    - Poll 5 – Select high priorities
        - Explore opportunities for solar power and battery backup at critical facilities
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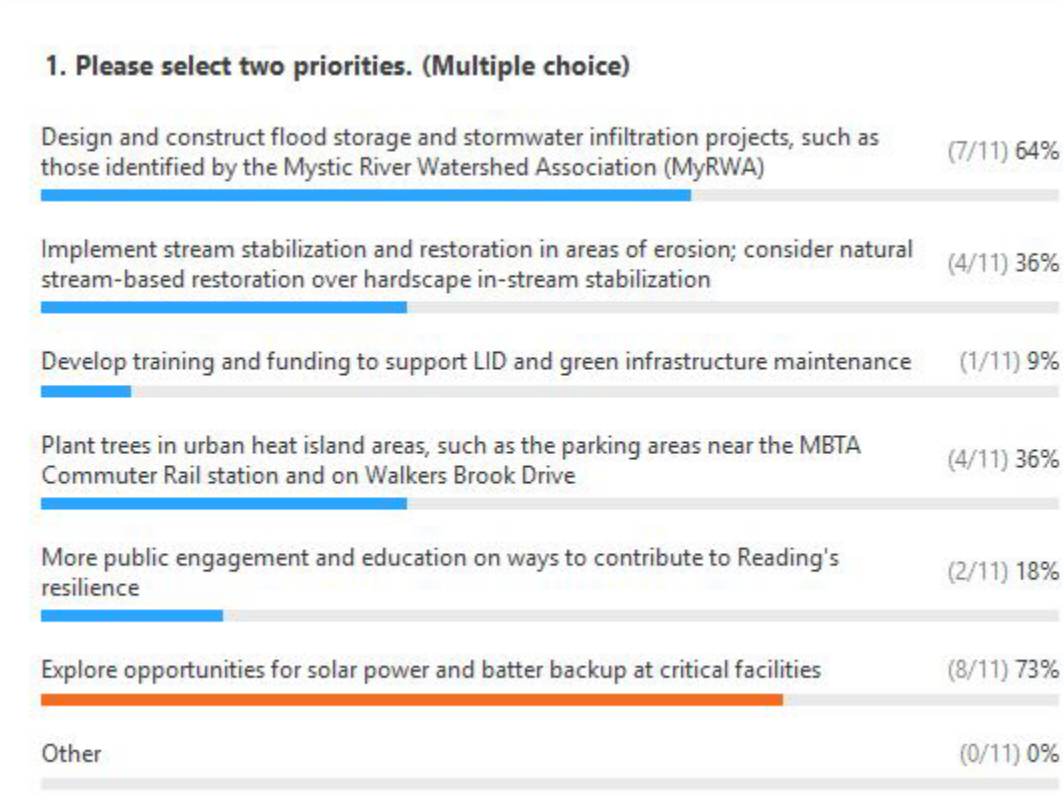

Reading MVP Question and Comment Form

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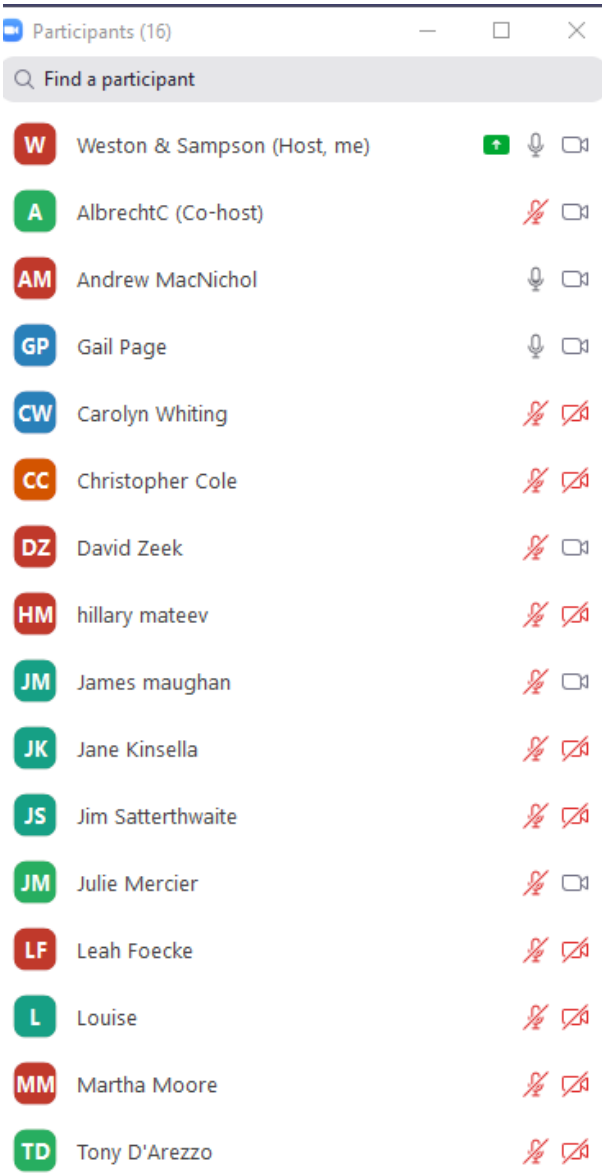
Reading Public Engagement

Reading MVP Listening Session
Thursday, June 11th
5 p.m. – 6:30 p.m.

Attendee List



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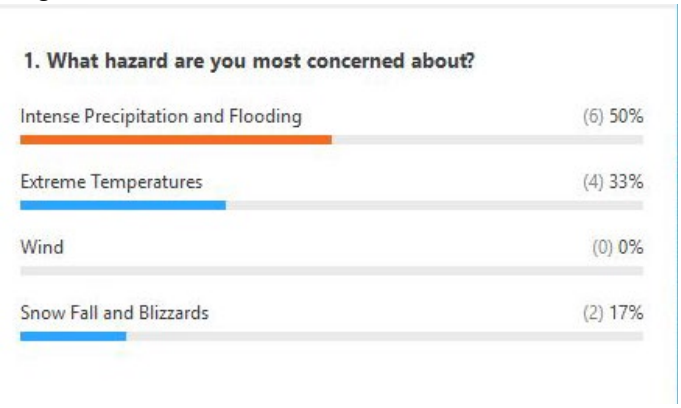

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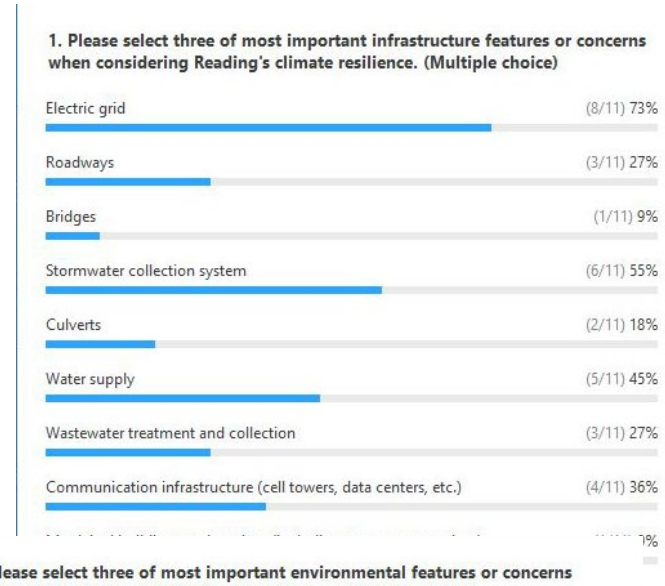

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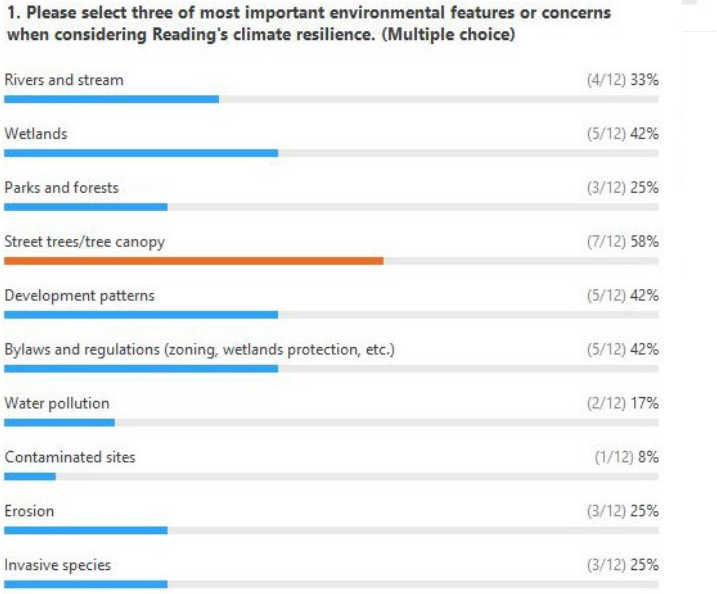

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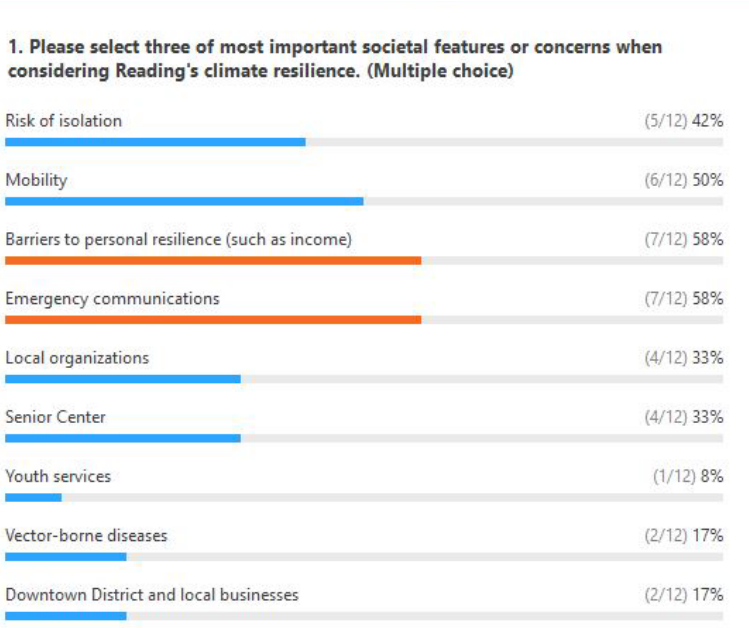

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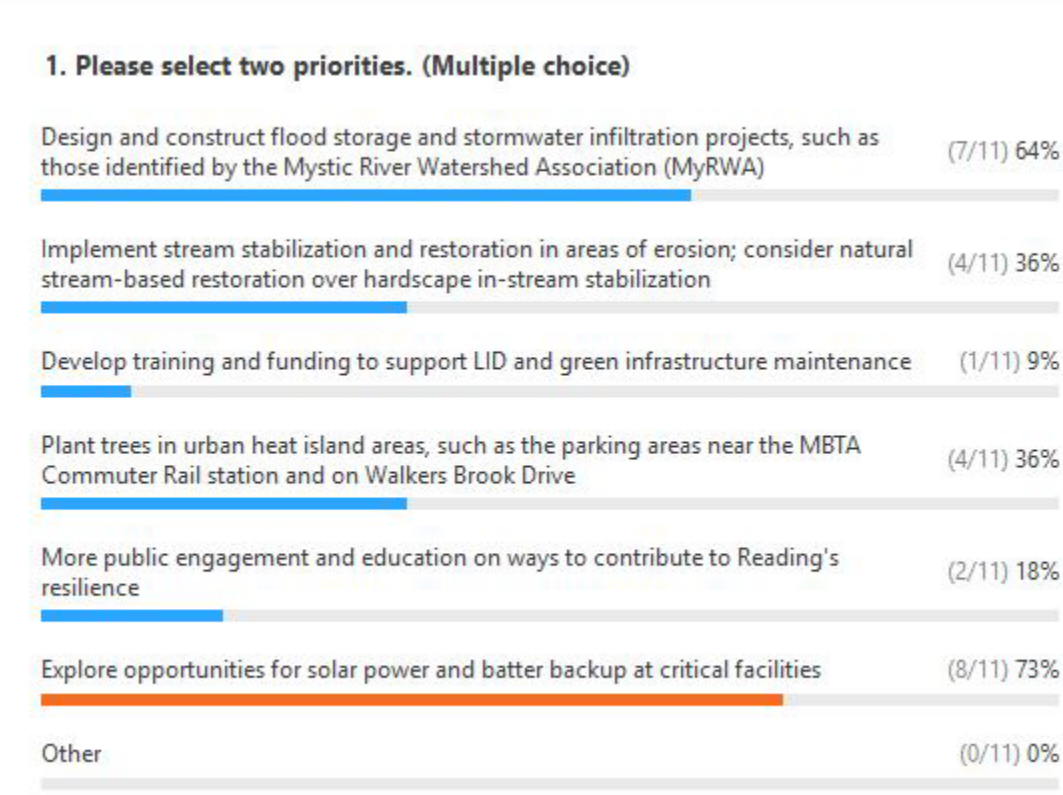

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