



CLIMATE CHANGE PREPAREDNESS & RESILIENCE

APPENDIX C:

LOCAL PERCEPTIONS OF DISASTER PREPAREDNESS IN THE ALEWIFE DISTRICT OF CAMBRIDGE, MA

City of Cambridge

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DRAFT



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LOCAL PERCEPTIONS OF DISASTER PREPAREDNESS IN THE ALEWIFE DISTRICT OF CAMBRIDGE, MA

A report by the MS in Urban Planning Program and the Urban Harbor
Institute, University of Massachusetts Boston



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I. Introduction

In the summer of 2016, the staff of the MS Program in Urban Planning and Community Development and the Urban Harbors Institute at the University of Massachusetts Boston attended a meeting organized by Ms. Nathalie Beauvais, Project Manager for the Kleinfelder's Cambridge Climate Preparedness and Resiliency Plan – The Alewife Pilot being prepared for the City of Cambridge. At this meeting, Ms. Beauvais introduced the UMass Boston attendees, including: Paul Kirshen, Bob Bowen, Ken Reardon, and Jack Wiggin to the work her firm was doing to assist the City of Cambridge in developing a preparedness and resiliency plan to address future climate-related challenges likely to face the City's rapidly growing Alewife District.

Acknowledging the important contributions that Professors Kirshen and Douglas had made to climate change research in our region by projecting likely sea level rise and related flooding risks in Boston and Cambridge, Ms. Beauvais indicated her firm's interest in securing assistance from UMass Boston faculty in assessing the possible risks vulnerable populations, such as: senior citizens, persons with disabilities, single parent households, low-income individuals and families, and new immigrants might face in the event of a:

- Severe heat event lasting several days
- Heavy rains causing basements and streets to flood and become impassable
- Winter storms featuring significant accumulations of snow and ice making safe local travel impossible
- Interruption of electrical power due to excess demand and/or equipment failure
- Riverine flooding caused by spring thaws and/or heavy seasonal rains
- Building damage caused by tropical storms

Eager to support local officials' efforts to enhance our region's level of disaster preparedness, Jack Wiggin, Executive Director of the University's Urban Harbors Institute and Ken Reardon, Professor and Director, of UMass Boston's newly-established MS in Urban Planning and Community Development Program agreed to work with Kleinfelder and the City of Cambridge in designing a cost-effective strategy for assessing the Alewife community's current level of disaster preparedness, especially as it relates to the special needs of the vulnerable populations, identified by the engineers, architects, and planners participating in this effort.

Following this initial meeting, Jack Wiggin and Ken Reardon met with Kleinfelder and City of Cambridge representatives to identify the central research questions UMass Boston researchers should seek to answer. Following this meeting, Ms. Beauvais and Professors Reardon and Wiggin prepared a preliminary Scope of Services for the City of

Cambridge to review and adopt. This scope featured a scan of the existing best practices in community-based disaster preparedness, management, and recovery planning; a limited number of institutional interviews with organizations serving members of the already identified vulnerable segments of the Alewife population; and a series of “man/woman in the streets interviews” commonly referred to as interceptor interviews.

Due to this focus on individual and group perceptions, it is important to remember that all findings generated from interview and focus group data as presented in this report may or may not accurately reflect actual realities in Alewife. In those cases where local stakeholder perceptions may not reflect realities on the ground, the City and its partners may need to consider additional outreach, communication, and educational activities to address these misperceptions.

Following this initial “scoping” meeting, the UMass Boston faculty participating in the Alewife Resiliency Planning effort attended a half-day workshop organized by Kleinfelder to share the preliminary results of their Vulnerability Assessment Study for the Alewife District. This meeting also provided the consultants working on various aspects of the Alewife Resiliency Plan to share their initial scopes of service and early research findings. This meeting concluded with a discussion of “most likely” climate-related risks for 2020, 2050, and 2070 that highlighted heat waves and heavy precipitation resulting in street flooding as the most likely short-term climate change-related disasters Alewife stakeholders were likely to experience.

In the early fall of 2016, the UMass Boston faculty participating in the Alewife Resiliency Planning effort attended a second half-day workshop organized by Kleinfelder and the City of Cambridge to which key municipal and community stakeholders were invited to discuss key findings from the Climate Change Vulnerability Assessment (CCVA) report as well as the preliminary policies and recommendations for strategies for the Climate Change Preparedness and Resiliency (CCPR) Plan. Among the consultants contributing to Kleinfelder’s Alewife area were those examining: traditional and non-traditional storm water management techniques; green infrastructure proposals; energy conservation methods; smart energy and urbanism strategies; economic development potential of green design; and community-based and resident-led disaster preparedness, management, and recovery. Feedback provided by city officials and community leader participating in this meeting was subsequently used to refine each consultant’s scope of work, including that of our Team.

II. Scope of Services

Kleinfelder and the City of Cambridge worked closely with the UMass Boston Alewife Planning Team to formulate a research design to answer the following three questions:

Central Research Questions

- What do Alewife residents perceive to be the greatest natural disaster-related threat facing their households?
- How confident are Alewife residents in their ability to manage the health and welfare needs of their households/workforce in light of this and other natural disaster threats?
- What are the single most important steps local service providers, in collaboration with the City of Cambridge, can take to enhance these households' overall disaster readiness?

Preliminary Research Design

Working with Ms. Beauvais, Professors Reardon and Wiggin formulated the following multi-part research design.

Part I: Quick scan of best practices in community-based disaster planning – The Team committed itself to reviewing best practices in disaster planning contained in the Rockefeller Foundation's 100 Resilient Cities Report. Special emphasis was placed on identifying resident-initiated resiliency efforts carried out at the neighborhood scale.

Part II: Limited number of formal interviews with social service providers serving the poor – The Team agreed to interview senior executives from a minimum of four human service organizations providing services to members of vulnerable populations within the Alewife neighborhood to elicit their views on the unique disaster preparedness, management, and recovery needs of these households.

Part III: "Man/Woman in the street" interviews with residents of the Alewife district – The Team agreed to conduct brief interviews with as many local residents as they could reach during a two-day period in mid-November to gain a deeper understanding of the possible climate-related disasters that most concern them and the actions they would like to see local institutions and the City take to support their own disaster preparedness efforts.

Amendment to the Initial Research Design

When representatives of a local civic organization that had been actively involved in a variety of local planning issues resisted designating a single person for us to interview, the UMass Boston Research Team agreed to hold a focus group with representatives of the Alewife Residents' Alliance. The richness of the data generated at this meeting, prompted the UMass Boston Research Team to pursue a second focus group with the Alewife Business Association representing owners and occupants of several newly constructed commercial buildings located within the district. Thus, focus groups became a fourth element of our Team's research design.

Data Analysis

Local stakeholders' perceptions of the greatest natural disaster risks confronting the community, the current state of disaster preparedness in Alewife, and the actions local institutions and Cambridge municipal government could take to enhance local household and business safety were then compared using the Strengths, Weaknesses, Opportunities, and Threats (SWOT) Analysis Technique initially developed by Stanford Research International and later popularized by the Harvard Business School to analyze complex data sets. This analytical approach is designed to identify and summarize common perceptions of the strengths and weakness of complex systems held by different informants and collected using different research techniques.

Again, just because a cross-section of local stakeholders share a common perception of some aspect of local disaster preparedness, this doesn't make it true. Such a contradiction between local stakeholder perceptions and existing conditions may suggest the need for new community outreach and engagement activities.

III. Best Practices in Community-Based Disaster Preparedness, Management, and Recovery Planning

The UMass Boston Alewife Planning Team reviewed the Rockefeller Foundation’s recently issued 100 Resilient Cities Report as well as several disaster preparedness and resiliency guides prepared by the Enterprise Community Partnership and the U.S. Department of Housing and Urban Development to identify innovative disaster preparedness initiatives that local residents, in cooperation with community-based service organizations and their respective municipal administrations, can implement to reduce the risk vulnerable populations within Cambridge might experience during likely future climate-related disasters.

Among the specific “best practices” in community-based resiliency planning members of the UMass Boston Alewife Research Team identified were the following:

New Orleans, Louisiana

Community residents, local design professions, municipal planners, and Louisiana Recovery Authority officials with support from the Rockefeller Foundation prepared The Citizen’s Guide to Land Use Policy and The Citizen’s Guide to Urban Design to encourage more climate sensitive redevelopment in New Orleans and along the Gulf Coast following Hurricanes Katrina and Rita. These Guides have been used by local citizens, planners, and other design professionals to revise and implement new land use and building maintenance regulations in dozens of coastal communities in Louisiana, Mississippi, Alabama, and Texas.



The City has also worked with the Foundation for Louisiana to capitalize a Coastal Resiliency Leverage Fund to enable families, institutions, and businesses to carryout needed redesign and renovation of structures to make them more resilient. Currently, financial institutions funding the construction or rehabilitation of residential and commercial structures resist the inclusion of resiliency building features within traditional “pro formas” making these improvements difficult to finance.

Finally, the City of New Orleans has contracted with a local non-profit, Evacuteer, which recruits, trains, and manages evacuation volunteers who assist New Orleans' emergency response services in getting vulnerable individuals and families to safety in the event of major climate-related disasters. This partnership between the non-profit and the City was tested during Hurricane Gustav and is credited with helping to move more than 18,000 vulnerable New Orleanians out of harm's way.

Berkeley, California



with a \$1.5 million grant from the California Energy Commission, the proposed microgrid would create electricity from solar panels atop the new Center Street Garage, storing power in energy storage batteries that could be used for the garage or as clean backup energy to neighboring key buildings, such as City Hall and the Public Safety Building. During a climate-related emergency localized microgrids could power heating and cooling stations, emergency health clinics, communal kitchens, cell phone and laptop recharging nodes, and temporary housing facilities.



Building upon a series of successful block parties promoting climate preparedness, Berkeley has established a network of Community Resiliency Centers where city staff work with local institutional leaders to identify vulnerable populations; carryout ongoing resiliency research, education, and programming; and pre-position emergency equipment and supplies in anticipation of likely disaster events.

The City of Berkeley is also in the process of designing a microgrid to provide power from clean energy sources to key downtown facilities for daily use as well as when power is disrupted. Funded



Philadelphia, Pennsylvania

West Philadelphia residents, middle schoolers and UPENN students and faculty, working under the direction of Professor Ann Whiston Spirn, formerly of UPENN, now at MIT, launched a citizen study of the Mill Creek portion of their watershed prompting their neighbors to: install flower boxes, rain barrels, green roofs and walls, and rain gardens; incorporate Green Infrastructure into their newly constructed public school; establish outdoor classrooms at local schools where students can learn how natural features, the built environment, and human behaviors interact to shape the quality of urban life they enjoy; and lobby municipal officials to “daylight” portions of their long culvertized creek to improve storm water management while creating an important new environmental amenity. The success of this resident-driven climate change initiatives prompted residents of nearby communities to undertake similar efforts. This grassroots environmental action movement, subsequently prompted former Mayor Nutter to establish one of the nation’s first Sustainability Offices.



New York, New York

The 5th Avenue Committee's Organizer in Brooklyn's Turning the Tide Community works with residents of five public housing projects affected by Hurricane Sandy to hold public agencies accountable for implementing local affirmative hiring, contracting, and workforce development goals contained within the Resilient New York Plan.

The NYC Planning Commission also passed 16 separate laws to encourage more resilient residential, commercial, industrial and civic buildings. A summary of the most important of these acts appears below.



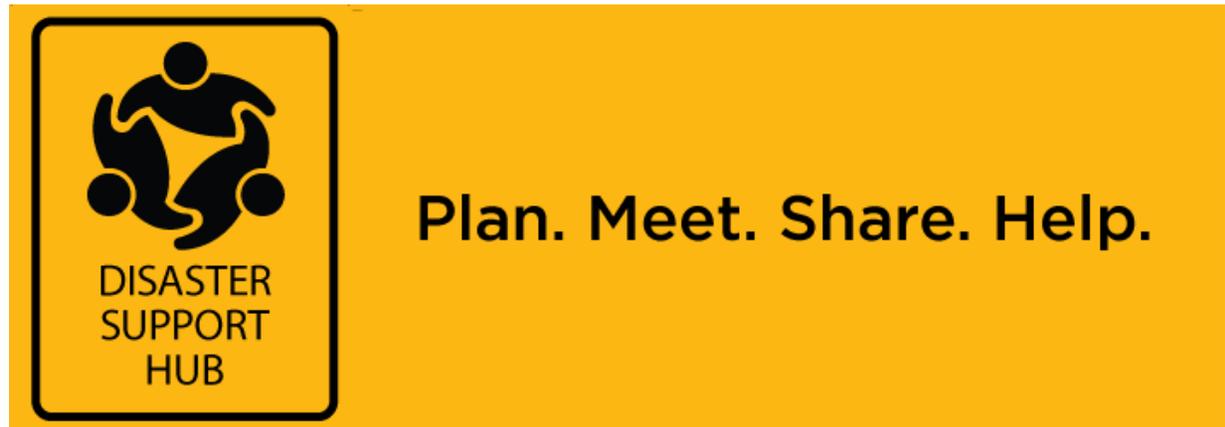
Most Significant Post-Sandy NYC Resiliency Laws

Local (NYC) Laws	Description	Effective	Proposed By
96/13	Survey Data and Flood Maps	November 19, 2013	DOB
29/13	Raising and Moving Buildings	April 2, 2013	DOB
83/13	Preventing Sewer Backflow	October 2, 2013	BRTF
99/13	Cable Length and Fuel Oil Storage	November 19, 2013	BRTF
109/13	Temporary Flood Shields	December 2, 2013	BRTF
111/13	Emergency and Standby Power	December 2, 2013	BRTF
95/13	Protecting Patient Care Areas	November 19, 2013	DOB
82/13	Providing a Flood Manual	October 2, 2013	BRTF

In addition to these municipal laws, the State of New York enacted the Community Risk and Resiliency Act (CRRA) on September 22, 2014 that features five provisions designed to promote more sustainable approaches to planning and development. Among these acts is legislation featuring official sea level rise projections; permit guidance in light of sea level rise and storm surge flooding; smart growth infrastructure policies, guidance on natural resiliency measures, and model local laws concerning climate risk.

Vancouver, British Columbia (Canada)

The City of Vancouver has established 25 Disaster Support Hubs, conveniently located and unlikely to be affected by major seismic and climate-related disasters, where local community leaders can meet with municipal disaster officials to identify and prioritized disaster management and recovery needs.



San Francisco, California



The City of San Francisco’s Neighborhood Empowerment Network (NEN) has helped residents, business owners and institutional leaders from eight “high risk” communities complete and implement individualized disaster readiness and response plans based on FEMA’s Whole Communities Program. Among the features of these plans are Mobile Caches of Disaster Supplies as well as Go Bags for Seniors and Persons with Disabilities containing survival supplies they might need in the event of an evacuation.



Portland, Oregon

The City of Portland has organized an ambitious disaster preparedness and climate resiliency popular education program called Planning for Resilience and Emergency Preparedness (PREP). Among the courses offered are: Your Resilient Neighborhood focused on citizen storm water and heat management strategies and Should I Stay or Should I Go – a class examining “real time” disaster survival, management, and recovery scenarios designed to encourage heads of households, institutional leaders, and business owners to develop alternative plans to address specific disaster threats.



Natick, Massachusetts

The Shelter Technology, Engineering and Fabrication Unit at the U.S. Army Soldier Research Development and Engineering Center in Natick, Massachusetts has designed highly durable but light weight temporary shelters that can be used in any climate to serve as planning centers, heating and cooling stations, portable health clinics, and temporary shelters for those affected by a wide range of climate-related disasters. The use of solar and photovoltaic panels to generate energy for these units make them ideal for a wide range of disaster management and recovery purposes.



These units can also serve on a “stand alone” basis to provide small group quarters or several can be connected to function as administrative and/or health care facilities.

Establishing Metrics for Evaluating Community-Based and Resident Led Disaster Preparedness, Management, and Recover Efforts

A review of the disaster literature suggests consideration for the following outcome measures when developing policies, plans, and programs designed to promote community-based and resident-led disaster preparedness, management, and recovery efforts within the Alewife Disaster Preparedness and Resiliency Planning Pilot Project (ADPRPP).

- **Resiliency Planning Education and Training** – As measured by the number and/or ratio of vulnerable residents engaged on an annual basis in resiliency education and planning activities organized by Alewife-based community organizations
- **Disaster Preparedness and Climate Resiliency Planning** – As measured by the number and/or ratio of Alewife-based public agencies, non-profit organizations, housing developers and management, and business organizations that have prepared and regularly update their own disaster preparedness, management, and recovery plans.
- **Disaster Simulation Exercise** – As measured by the number and/or ratio of Alewife-based public agencies, non-profit organizations, housing developer and management, and business organizations that participate in a bi/tri-annual disaster simulation training exercise organized by local, state, and federal disaster management agencies.
- **Alewife Emergency Alert System** – As measured by the number and/or ratio of vulnerable residents connected to an “early warning” system – text messages/phone calls providing them with possible weather–related threats information organized by and through Alewife-based community organizations (churches, schools, senior centers, libraries, social service organizations).
- **Expansion of Emergency Service Center** – As measured by the number and/or ratio of individuals who can be served at emergency service centers during a severe heat wave, power outage, and/or tropical/winter storm.

IV. Summary of Institutional Interviews

Who participated in the institutional interviews?

Between mid-September and mid-December, Ken Reardon, Professor and Director of the MS Program in Urban Planning and Community Development, and Matthias Täger, an MS in Urban Planning and Community Development student, conducted formal interviews with representatives of the following organizations providing direct services to individuals and families from Alewife District identified as vulnerable by the staff of the Cambridge Preparedness and Resiliency Planning Initiative.

- St. James Episcopal Church Young Adults Group
- St. James Episcopal Church Seniors
- Cambridge Housing Authority
- North Cambridge Senior Citizens Center
- American Red Cross of Massachusetts
- Homeowner's Rehab Inc.

What was the format of these interviews?

These interviews were conducted using a semi-structured interview schedule approved by representatives of Kleinfelder and the City of Cambridge. Half of the interviews took place in the offices of these organizations and half took place in various eateries in the Alewife District. The interviews lasted between 45 and 90 minutes based largely upon the degree to which the organization was directly involved in disaster preparedness, management and recovery efforts.

To what degree were these organizations directly involved in disaster preparedness, management, and recovery planning and programming?

The interviewees represented a mix of board members, volunteer coordinators, and senior staff from these organizations. Two of the organizations participating in the institutional interview process had explicit responsibility for serving the general public in times of disaster (i.e. American Red Cross of Massachusetts and the North Cambridge Senior Citizens Center), two housing organizations participating in this process had responsibility for insuring the health and safety for tenants living in buildings they managed during disasters (i.e. Cambridge Housing Authority and the Homeowner's Rehab Inc), the two social ministries of St. John's Episcopal Church had no formal responsibility for engaging in disaster-related

activities but felt a moral responsibility for assisting those with few resources as part of their efforts to minister to the mind, body, and soul of their congregation and community.

What are the current strengths of the Alewife community's disaster preparedness, management, and recovery services?

The City's effort to develop a preparedness and resiliency plan in anticipation of more dramatic climate-related challenges and disasters was viewed as a very positive development by the majority of the institutional representatives interviewed. These individuals were especially pleased to see the City and their consultants make a concerted effort to combine the local knowledge of disaster preparedness and climate resiliency needs in Alewife possessed by long-time residents with the expert knowledge of university-trained planning and engineering professionals. Several interviewees also commented on how delighted they were to see the City, under its most recent City Manager, seeking local stakeholder input at the "front end" of the planning process when such suggestions and proposals are more likely to shape policies, plans, and programs.

The Institutional Interviewees also expressed their confidence in the expertise and professionalism of the municipal agencies responsible for disaster preparedness and resiliency planning in Cambridge. They felt the Department of Public Works does an excellent job cleaning and removing debris from local streets, sidewalks, curbs, and storm drains thereby helping to reduce surface flooding. They also complimented the DPW's expertise in quickly and safely removing snow and ice from City streets, sidewalks, and bridges. They also spoke favorably of the Mayor's Office and the Superintendent of Schools' Office efforts to inform local stakeholders of impending weather threats enabling individuals, organizations, and communities to take appropriate action. They also expressed confidence in the combined expertise of the City's police, fire, and emergency service units, especially their ability to come to the aid of individuals and families in the event of a serious health emergency and/or life-threatening disaster.

What are the current weaknesses of the Alewife community's disaster preparedness, management, and recovery services?

The interviewees believe the City's approval of the construction of many high-density residential and commercial buildings in the Alewife District has significantly increased traffic congestion in and around the Alewife traffic circle that serves as a major evacuation route for both Boston and Cambridge residents. Very few people believe the current evacuation route has the capacity to enable Alewife residents and employees to travel from the area in the event of a serious weather event.

Scholars in the field of disaster preparedness and resiliency planning, such as Robert Olshansky and Ed Blakely, highlight the critical role voluntary associations and community-based organizations play in informing local residents of

impending weather-related disasters, directing people to shelters and services during disasters, mobilizing local volunteers to undertake search and rescue activities, and initiating post-disaster recovery efforts. While Cambridge is blessed with a rich network of civically-minded tenant organizations, neighborhood associations, fraternal association, faith-based institutions, and community development corporations there has been little effort to strategically engage these “first responder” organizations in disaster preparedness, management, and recovery activities. While the City has appropriately charged the Cambridge Senior Citizens Council with responsibility for responding to the needs of seniors and the disabled during climate-related disasters, this remarkable organization lacks the resources to fulfill this role. Currently, there is a single telephone line staffed by one monolingual individual who is available to respond to disaster-related calls for assistance.

While the City has actively tried to inform the leaders of local institutions about the general climate-related risks they, their employees, and their members/customers face; they have been less effective in communicating the specific nature of the risks local households, businesses, and institutions face and the specific disaster preparedness policies, plans, procedures, equipment and resources they need to develop in order to be prepared for likely climate-related disasters. While two of the local institutions we interviewed had protocols and procedures to address one or two “possible disaster scenarios” and had purchased specific equipment for such purposes (i.e. upgraded air conditioning, back-up generators) or entered into contracts with transportation vendors in the event an evacuation was required; none of the organizations we spoke to have developed protocols and procedures to address the full range of possible climate-related disasters they are likely to confront in the near future. In most cases, disaster preparedness, management, and recovery issues, policies, and procedures are not typically addressed in either new employee training or ongoing professional development programs. Finally, none of the non-profit organizations whose leadership we interviewed had ever undertaken specific drills to insure that their direct service managers, facilities managers, and senior executives know exactly what to do in the case of a serious climate-related disaster.

While the City has done an effective job informing new and old residents of the potential climate-related risks they might face; they have been less effective in highlighting the steps families need to take in the event of a serious disaster. Most of the institutional leaders we interviewed did not have basic emergency supplies in their homes or businesses, did not have alternative evacuation and/or sheltering plans in the event they were forced to leave their homes, did not know where the nearest emergency services center was in the event of a serious disaster event, or know where to go for accurate and timely pre- and real-time disaster guidance. Most institutional leaders assumed they can secure the information they require to keep their families, staff, volunteers, and clients safe during an important climate event by visiting the City of Cambridge website or calling a trusted contact at City Hall. None of the institutional leaders we spoke to have considered how they would get such information in the event Alewife loses internet, telephone, and cable services or they are unable to recharge their smart technology devices.

What specific steps should the City of Cambridge consider taking to strengthen disaster preparedness, management, and recovery efforts in the Alewife District?

The institutional representatives we interviewed offered a number of proposals for the City of Cambridge to consider to improve the state of disaster preparedness, especially as it relates to vulnerable populations within the Alewife District.

Clearer communication of specific climate-related disaster risks to households and institutions

Using the newly developed vulnerability assessment, local institutional leaders felt the City could do a better job communicating the specific risks households and institutions face in targeted neighborhoods and the plans, policies, and procedures they should consider developing to maximize the safety of their members across the full range of climate-related disaster possibilities.

Mayoral action to insure that all city and municipal supported agencies have comprehensive disaster preparedness policies, plans, protocols, and procedures

While the Cambridge Senior Citizens' Council and Centers and the Cambridge Housing Authority have clear policies, protocols, and procedures to address heat emergencies, their staffs were not sure if they had developed similar strategies to address other possible disasters – heavy precipitation-related flooding, extended power failures, or a serious hurricane-like storm. Interviewees felt steps should be taken to insure that municipal agencies and other non-profits organizations they support develop, over time, a full-set of disaster plans and procedures.

Municipal leadership to insure that all new City managers and staff receive basic disaster preparedness, management and recover training as part of their new employee orientation and ongoing professional development activities

While those we interviewed believe the City has done a good job assessing current climate-related threats; they were unsure how aware various levels of municipal employees were of these threats and the specific policies, plans, and procedures to address them. For example, do they know where to look on the City website for “real time” weather information? Do they know who within their agency is responsible for disaster planning and management? Do they know the City’s policies regarding when to release workers from their duties to return to their homes? Do they have a list of essential workers whose services are needed in the event of a disaster? Do they know how to activate emergency back-up equipment in the event of a power outage? Do they know where to direct agency clients and/or nearby residents to go in the event of a disaster requiring evacuation?

Municipal leadership in mobilizing City, County, State, and Federal disaster management agencies to organize a regularly scheduled disaster management drill to evaluate the adequacy of the City's current disaster plans, policies, and procedures

While interviewees' readily acknowledge that the City has invested considerable effort in assessing climate vulnerabilities and formulating appropriate plans, they are unaware of steps taken to insure that: a.) disaster preparedness and climate reliance plans, policies, and procedures have become internalized in the thinking, standard operating procedures, and management practices of local agencies; and b.) necessary coordination between local and regional agencies with disaster planning and response responsibilities has been established. Several interviewees suggested the value of organizing a regular disaster simulation drill to see how well municipal agencies and their community partners function.

Alternative evacuation routes should be explored given current and projected traffic congestion in the area of the Alewife Traffic Rotary

From the perspective of most institutional leaders, the ongoing densification of commercial and residential districts within Boston and Cambridge has caused considerable congestion on many major arteries. Nowhere are such traffic problems more visible and problematic than along the major arteries serving the Alewife community. It is difficult to find a single person who believes the currently marked Evacuation Route, Alewife Brook Parkway, could effectively serve this function in the event of a serious storm requiring residents and employees to leave the area. While several institutional interviewees referred to recent traffic counts that appeared to be falling; they explained these "improvements" by suggesting that this was most likely due to the "total" inability of traffic to move along the corridor due to bumper-to-bumper conditions. In addition, the fact that parts of the evacuation route are prone to flooding raises doubts for residents regarding the suitability of this route in case of a flood related disaster. Local institutional leaders feel the City has an obligation to work with its neighboring municipalities to explore the full range of evacuation modalities and routing options.

V. Summary of Focus Group Meetings

The UMass Boston Alewife Planning Team organized two focus group meetings in the Alewife District. In mid-September, the Team met with eight members of the Fresh Pond Residents Alliance, a well-established citizen organization that has actively participated in various municipally-sponsored planning processes, and the Alewife Business Association, a newly-formed group, organized to advance the interests of businesses located in the area immediately adjacent to the Alewife MBTA Station.

Summary of the Fresh Pond Residents Alliance Focus Group

This meeting took place on Tuesday, September 21, 2016 at the Panera's Restaurant located on Alewife Brook Parkway. Matthias Täger, an UMass Boston Graduate Research Assistant and I, facilitated this focus group that involved eight members of the Fresh Pond Residents Alliance. This meeting convened with the assistance of Alison Field-Juma, Secretary of the Fresh Pond Residents Alliance, lasted approximately ninety minutes and covered the following topics.

Citizen Participation

While critical of the modest amount of information the City has shared with the community regarding climate-related threats confronting local stakeholders and the small number of local residents and organizations the City has elicited input from as part of the Alewife resiliency planning initiative; these residents were unanimous in their belief that the City of Cambridge had become noticeably more transparent and responsive to citizen concerns under its most recent City Manager. In addition, they viewed their invitation to participate in this focus group, organized by a sub-contractor of the City Community Development Department (i.e. UMass Boston), as important evidence of this new openness to input. Those participating in the meeting hoped local government would continue moving towards greater transparency and responsiveness under the City's newly appointed City Manager.

Planning Fog and Fatigue

The participants shared their confusion and frustration regarding the number of overlapping planning processes currently underway in Alewife and the City of Cambridge as a whole. From their perspective, there was a lack of clarity regarding the goals and objectives of the City's ongoing master planning process and their recently launched resiliency planning initiative. They also felt the city's various agencies were not clear on the goals and objectives of each of these planning efforts. Minimally, they felt the City should have produced and distributed on-line and printed copies of a brochure

explaining the goals, objectives, processes, expected outcomes, and complementarity of these two important public planning processes underway. They also felt such a document should identify the individuals with “lead” planning responsibilities for each effort.

Neighborhood Development Patterns

The residents were pleased to provide input into the Alewife resiliency planning process as they have, both individually and collectively, in the past. However, they are also eager to see the City make a greater effort to manage future development in their community in a manner that is more consistent with the plans they have worked closely with the City to formulate. They have been disappointed by the City’s perceived failure to enhance the quality of life within the Alewife community by promoting a wider range of housing options, higher quality local retail services, a more walkable neighborhood fabric, improved mobility through expanded transportation choices, and a renewed commitment to urban design that gives greater attention to the development of the public realm – small playgrounds, neighborhood parks, complete streets, and third places.

In addition, they argued for the importance of these elements of traditional neighborhood design, present in select subareas of their community such as Huron Village, as essential community-building ingredients. They stressed the important role inspired urban design can play in nurturing the development of social capital needed to help neighborhood residents prepare for, survive, and recovery from serious climate-related disasters. These residents believe the increasingly popular multi-family apartment buildings, constructed over ground floor parking, will isolate the majority of West Cambridge’s new residents during serious rain/snow events by disabling their cars making it impossible for them to evacuate. The residents referred to these new buildings as “gilded ghetto boxes” that provide adequate shelter for their residents, at a premium price, in an environment increasingly bereft of the civic, cultural, retail, and recreational amenities essential to high quality urban living. The residents also described the contribution these buildings that feature one and two bedroom apartments attractive to young professionals have made towards making West Cambridge a more transient and, as a result, a less resilient community. They explain how young professionals move into the community and start families before moving to the suburbs when their children reach school age. They believe this process undermines local community building efforts critical to the generation and maintenance of social capital that the emergency preparedness literature suggests is an essential ingredient to the development of truly resilient communities. They highlighted how serious this problem becomes when this form of multi-family housing becomes the dominant residential building type in a community.

Risk Assessment

Those attending the meeting agreed with the overall assessment of climate-related risks presented in the City's vulnerability report. They felt at minimum risk from rising seas and storm surges from the Atlantic and overtopping of the Charles River in the spring and/or following intense storms. However, they felt vulnerable to street flooding, business/service closings, and power interruptions caused by increasingly frequent and intense rainstorms; street blockages, business/service closings, and power losses caused by unusually heavy snows and ice storms; and extended periods of high temperatures that put the elderly, children, and those with physical disabilities at risk.

Vulnerability Assessment

The residents believed all of the vulnerability groups identified by the City of Cambridge deserved special attention within the resiliency planning process. However, they felt the list of vulnerable groups was incomplete. They believed the following groups within West Cambridge must be added to the list of those "at risk" whose needs deserve special attention within the resiliency planning process:

1. New immigrants – These newcomers to Cambridge tend to reside in the City's oldest housing which is often located in less desirable areas that maybe at greater risk during storm events or heat waves. Many of these units are basement apartments that frequently experience flooding and water damage. These families, as newly arrived may also be less aware of the City's disaster preparedness plans and warning systems. As recent arrivals to the City, they may also have more modest support networks to draw upon in the event of a climate-related disaster. Finally, some may benefit less from the City's traditional disaster-related communication efforts due to language barriers and other cultural differences.
2. School-age children – The abolition of "so-called" neighborhood schools requires the busing of a significant number of children throughout the City. In the event of a sudden downpour and related flooding or an unexpected winter storm that makes roads impassable these children could be prevented from returning to their homes and families placing significant shelter and service burdens on the School District, the City, and local non-profit organizations.
3. Residents of publicly assisted housing - While the list of vulnerable populations prepared by the City includes residents of traditional public housing complexes and Section 8 buildings, it did not include the hundreds of low to moderate income families that are living in the 11% "affordable housing" units mandated for newly-constructed, multi-family residential buildings in the City. Unlike traditional public housing complexes and Section 8 Buildings these

families are living in residential buildings without access to case management and other support services provided by other types of affordable housing thus making them more vulnerable in the event of a disaster.

4. Residents of newly constructed high density/raised over parking buildings in West Cambridge – Residents of these buildings are unlikely to experience housing damage and property losses due to the most likely climate-related disasters – i.e. intense precipitation and high temperatures. However, they are unlikely to have access to their private automobiles in the event of serious flooding or heavy snows making it difficult for them to access their jobs and critical services including: food stores, banks, health care, and internet services.

Gridlock on Local Arteries During Serious Storms Events

Those attending the meeting described the glacial nature of the traffic flows along the major intersections surrounding the Alewife Station on non-storm days. They emphasized the difficulties residents face using these arteries to either access local services and/or to evacuate the area on serious storm days. They also pointed out that the neighborhood's major east-west artery was also the designated "Evacuation Route" for Boston residents seeking higher ground in the event of a major storm. Experience during such events suggests that traffic back-ups along this street would render it ineffective as an Evacuation Route for either Boston or Cambridge residents, especially since parts of the route are prone to flooding. Having made this point, they emphasized the importance of working with surrounding municipalities and regional agencies to develop a cooperative approach to disaster preparedness, management, and recovery and alternative evacuation routes and modalities.

Outreach to Schools and Faith-Based Organizations and Affordable Housing Complexes

Those attending the meeting urged the City to make a more concerted effort to engage both area schools and religious institutions in their resiliency planning efforts. They argued that these institutions have significant contact with and deep relationships with many of the individuals, families and communities identified as vulnerable. They pointed out the ability of the schools to send information to families via "Backpack Wednesdays" and the ability of faith-based organizations to reach families through announcements made during weekly religious observances. They also felt that housing managers of complexes with Section 8 voucher holders could be another important vehicle for contacting and serving vulnerable families and individuals.

Additional Outreach Suggestions

The residents strongly supported the City's plans to reach a cross-section of local institutions through one-on-one interviews. They also felt our planned "interceptor surveys" could be helpful. In addition, they encouraged us to involve a local community organizer, Lorie Lander, to convene a second Focus Group of local institutions and networks that serve the poor. Finally, they identified the location of a homeless camp that we might be able to visit, with an outreach worker from a local institution, to gather input on the state of disaster planning and climate resiliency among those without secure shelter.

Summary of the Alewife Business Association Focus Group

This focus group took place on Wednesday, November 30th in a First Floor Conference Room of 150 Cambridge Park Drive. The meeting convened by William Ahearn, a local attorney who serves as the President of the Alewife Business Association, was co facilitated by Matthias Täger, a UMass Boston Graduate Planning Student, and Ken Reardon, Professor and Director of UMass Boston's Graduate Program in Urban Planning and Community Development. Two local stakeholders, representing a local law firm and the City of Cambridge's Community Policing Program participated in the meeting that lasted approximately one hour and addressed the following climate-related disaster issues and concerns.

Perceived Threats

The participants viewed prolonged heat waves, building and street flooding caused by heavy rains, and severe winter storms that make local streets impassable as the most likely climate-related disaster events residents, institutions, and business would have to confront in the near-term. In fact, the representative of the local law firm reported having closed their office and sent their employees home several times during the past year in anticipation of heavy rains and snows that made local streets impassable.

Unaware of Any Existing City Preparedness and Resiliency Plans

Those attending the focus group were unaware of any existing preparedness and/or resiliency plans for their area. They did not know which municipal agency was responsible for disaster preparedness and resiliency planning. In addition, they did not know where they, their employees, and customers might go in the event they had to evacuate their building. Finally, they were unsure as to where to access reliable "real time" data in the event of an actual disaster.

Lack of Firm/Building Level Disaster Preparedness Plans

Despite having carried out early business closings in anticipation of storm-related travel problems, the law firm has not developed specific policies to guide future closing decisions. Nor have they discussed possible equipment and supply needs in the event some and/or all of their staff needed to shelter in space. While they have a small kitchen that would allow them to store and prepare food for a portion of their staff, they were not sure if their building's back-up generators would have sufficient power in the event of an extended power loss to support their refrigerator, stove, and microwave.

Engaging Local Property Managers in Disaster Preparedness Planning and Management

To date, the law firm has not discussed disaster preparedness, management, and recovery plans with the management company that operates their two-year-old commercial building. Those attending the focus group believed it would make sense to assemble the relatively small number of property management firms that service a significant number of the neighborhood's newly-constructed residential and commercial buildings to: a.) provide them with the best available information regarding climate-related risks; b.) elicit information regarding their current state of disaster preparedness; c.) inventory stakeholder concerns regarding future disaster possibilities; and d.) discuss how the City could collaborate with them to introduce state-of-the art disaster preparedness policies and procedures similar to those pioneered by the Enterprise Community Partnership for affordable housing complexes.

Expanding Egress Alternatives in the Event of a Serious Disaster

Both participants expressed serious concerns regarding the adequacy of existing evacuation routes in the event of serious flooding. They described the district's increasing level of congestion during rush hours and non-rush hours as the pace of high-density residential and commercial development has proceeded intensified. They explained how the area's traffic flow was often complicated by minor flooding along New Street in the district and Route 2 near Arlington resulting in intense and extended gridlock conditions. They encouraged municipal planning officials to undertake a study of transportation alternatives to significantly reduce car dependency by those who work and live in the district.

Inspecting the Oil, Gas, and Chemical Storage Tanks Along the Shoreline

While acknowledging the problem heavy rains and snows cause residents, employees, and visitors to the District, the Community Policing Officer highlighted the potential threat local chemical storage tanks located near the river posed to the local community. Having observed the destruction of large oil, gas, and chemical storage tanks in the Lower 9th Ward of New Orleans during Hurricane Katrina, the Officer advocated a systematic structural inspection of these tanks to determine

their likely performance (i.e. safety) during a serious storm event. He pointed out that one tank containing chlorine owned and operated by Baystate Pool Supplies, a large swimming pool service company, would require a fifteen square mile evacuation zone in the event of a structural failure. They also mentioned storing facilities located on the properties of MIT and other nearby educational and medical facilities that could also negatively affect the Alewife community in the event of serious flooding due to potentially expansive impact radius of released hazardous substances.

Promoting Local Community Building

The rapid development of the Alewife area, featuring high-density residential and commercial buildings with few public open spaces and community-based institutions, has produced a community with a relatively low level of social capital – a critical resource when communities are facing serious threats such as natural disasters. Attendees believed the high turnover rate in the new “market rate” housing complexes that feature one and two bedrooms popular among younger members of the so-called “creative class” who move into these units as young childless couples and move out when their children approach school age served to undermine neighborhood solidarity. Attendees felt the city should make a concerted effort to encourage connections and relationships among these new Alewifians through a small number of well-organized and promoted civic events – possibly a fun run benefitting local non-profits, a Saturday evening concert series, and an outdoor film series featuring classic films.

Reverse 911 to for Disaster Preparedness and Community Resiliency Planning and Mobilization

The participants encouraged the City to consider using various advanced technologies to communicate basic disaster preparedness, management, and recovery efforts. Among the suggestions, attendees made was the use of Reverse 911 and texting to communicate critical disaster-related information to citizens, institutional leaders, business operators, and elected officials.

VI. Summary of Alewife “Man/Woman in the Streets” Interviews

In mid-November, Lindsey Connors, Gerard Cogliano, Matthias Täger, and Carlos Velasquez, students enrolled in the UMass Boston MS Program in Urban Planning and Community Development, assisted Professor Reardon in conducting interviews with Alewife residents regarding their climate-change related disaster experiences and future expectations. These so called “interceptor interviews” took place in front of the CVS, Trader Joe’s, and Dunkin’ Donuts Stores located on the Alewife Brook Parkway within sight of the Alewife MBTA Station.

These interviews were conducted using a semi-structured interview schedule containing 3 open- and 7 close-ended questions that took between five and ten minutes to complete. During an eight-hour period on a Friday and Saturday, the UMass Boston Team was able to conduct 92 interviews with Alewife residents. The results of these interviews are presented below.

Close-Ended Interview Questions

Table 6.1: Years of Residency in Alewife

Years of residency	Number of interviewees	Percentage of interviewees
< 2 years	17	18%
2-5 years	14	15%
6-10 years	16	17%
> 10 years	45	49%

As is evident from Table 6.1, the UMass Boston Alewife Planning Team was able to conduct interviews with a mix of both short and long-term residents.

Table 6.2: Previous Disaster Experience by Years of Residency in Alewife

Years living in Alewife	< 2 years	2-5 years	6-10 years	> 10 years	Sum	% of all interviewees
Extreme Heat Events	5	4	6	23	38	41%
Flooding After Heavy Rain	1	6	5	27	39	42%
Winter Snow Storms	2	8	11	37	58	63%
Power Losses	3	4	5	21	33	36%
Flooding from River	0	0	0	9	9	10%
Storm/Hurricane Damage	0	3	4	19	26	28%
Other Events	0	2	1	12	15	16%
Sum	11	27	32	148	-	-
% of residency-group	9%	28%	29%	47%	-	-

The most common climate-related challenge Alewife residents have experience were severe winter ice, sleet, and snowstorms that disrupted public transportation and made local travel hazardous. The next most common climate-related challenges reported by local residents were sidewalk and street flooding following heavy rains and extended heat waves. The former made local travelling difficult and the later placed the elderly, children, and adults with health problems at risk while travelling. It also presented special hardships for individuals and families living in apartments, condos, and private residents without air conditioning. Two other common climate-related challenges affecting Alewife residents was short-term power losses caused by downed power lines and short periods of excess demand and structural damage caused to their dwelling units by severe storms. Relatively few Alewife residents reported flooding caused by the overtopping of the Mystic River Watershed. Table 6.2 shows the number and percentage of residents that have experienced climate-related challenges increases the longer their period of residence.

Table 6.3: Household Confidence in Managing Future Climate-Related Challenges/Disasters

Degree of Confidence/Years of residency	< 2	2-5	6-10	> 10	Sum	Percentage
Very confident	1	3	3	11	18	20%
Somewhat confident	7	8	6	15	36	39%
Somewhat nervous	7	3	5	14	29	32%
Very nervous	1	0	0	3	4	4%
Sum	16	4	14	43	-	-
Response rate	94%	100%	88%	96%	-	-

Alewife residents vary in their degree of confidence regarding their households' ability to manage future climate-related challenges and disasters. One in five Alewife households are "very confident" in their ability to manage future climate-related challenges and disasters and two in five households are "somewhat confident" in their ability to handle future climate-related challenges and disasters. At the same time, one in three Alewife households reported being "somewhat nervous" about their ability to handle future climate-related challenges and disasters and one in twenty households reported being "very nervous" about their ability to manage future climate-related challenges and disasters.

Table 6.4: Current Level of Household Preparedness

Household Preparedness/Years of residency	< 2	2-5	6-10	> 10	Sum	Percentage
Emergency Supplies	3	6	4	26	39	42%
Plan	5	3	5	11	24	26%

Only two in five Alewife residents we interviewed lived in households that have emergency supplies on hand. Only one in four Alewife residents we interviewed live in households that have developed emergency evacuation plans in the event their dwelling units and/or block needed to be cleared for health and safety reasons. The overwhelming majority of those we interviewed did not know which City of Cambridge agency was responsible for disaster preparedness, management and recovery services. Nor did the majority of those we interviewed know the location of the nearest public facility where they might seek shelter in the event of a serious climate-related disaster. Most of those we interviewed assumed "real time" information would be available to them through either local cable news and/or the City of Cambridge website – most admitted they had never visited the City's webpage to locate such information. Most of those we interviewed registered shock and/or a nervous laugh when asked to consider how they would secure up-to-date disaster information in the event of a power outage affecting local TV news reception and Internet access.

Table 6.5: Reaching Out for Assistance During a Climate-Related Disaster

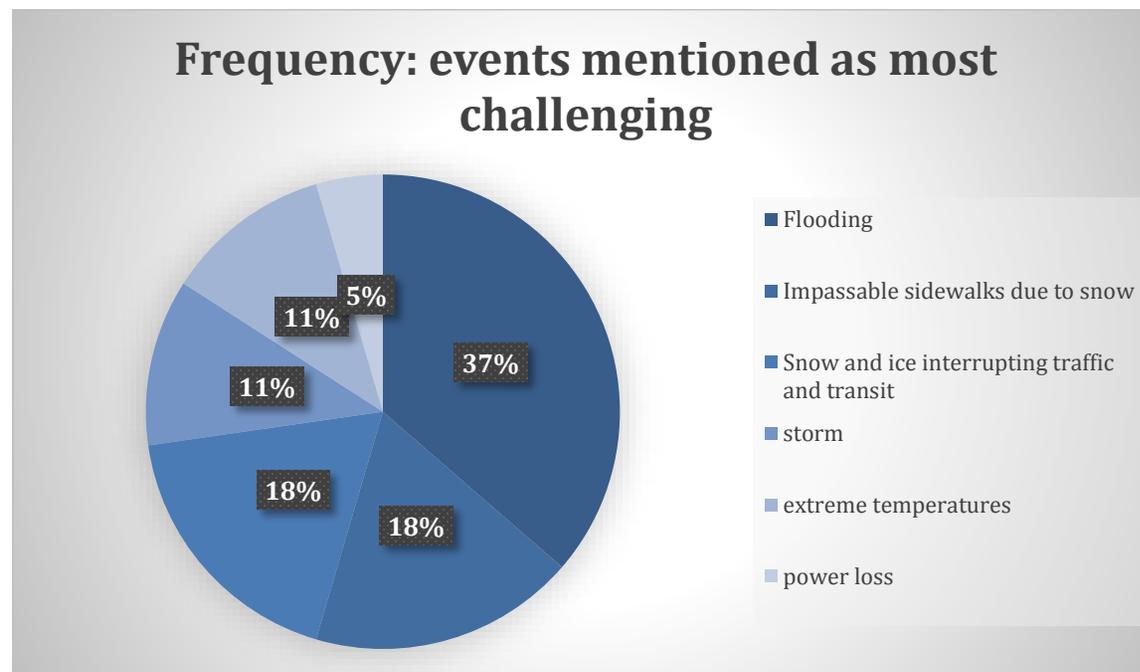
Outreach / Years of residency	< 2	2-5	6-10	> 10	Sum	Percentage
Family	11	8	10	25	54	59%
Friends	6	12	7	27	52	57%
Neighbors	4	4	9	25	42	46%
Employer/co-workers	5	3	5	8	21	23%
Faith-based community	2	2	2	5	11	12%
City of Cambridge	5	1	3	17	26	28%
Non-Profit	0	0	0	2	2	2%

Three out of five Alewife residents would turn to family members and friends in the event they were experiencing a serious climate-related challenge and/or disaster. Roughly half would also consider asking their immediate neighbors for assistance. These findings provide some evidence for the relevance of personal local networks in the event of a disaster. Roughly one in four residents would seek assistance from both their employer or fellow employees and the City of Cambridge for assistance. One in ten residents would request assistance from faith-based organizations they belonged to while only 2% would ask for assistance from local non-profits.

Opened-Ended Interview Questions

The following sections, summarizes Alewife residents' responses to a series of open-ended questions contained in the interceptor interview schedule.

Figure 6.1: Which Climate-Related Challenge/Disaster Have Caused You the Greatest Problems? Why?



Discussion

Flooding

Flooding was the event most frequently mentioned as being the most challenging. Both the flooding of basements and streets was mentioned. Common reasons given for this answer was the significant property damage flooding causes and the time and effort required for needed clean up.

Impassable sidewalks due to snow

The negative impact on mobility as well as the challenge of removing the snow from sidewalks which takes a great deal of time and requires significant physical strength and fitness were common reasons why impassable sidewalks due to snow was often mentioned as greatest challenge. Discontent with other residents not clearing the sidewalk in front of their properties was also mentioned several times.

Snow and ice interrupting traffic flow and transit services

Mobility restrictions for users of public transportation as well as for drivers were also identified as the main reasons for mentioning snow and ice as significant challenges for Alewife residents.

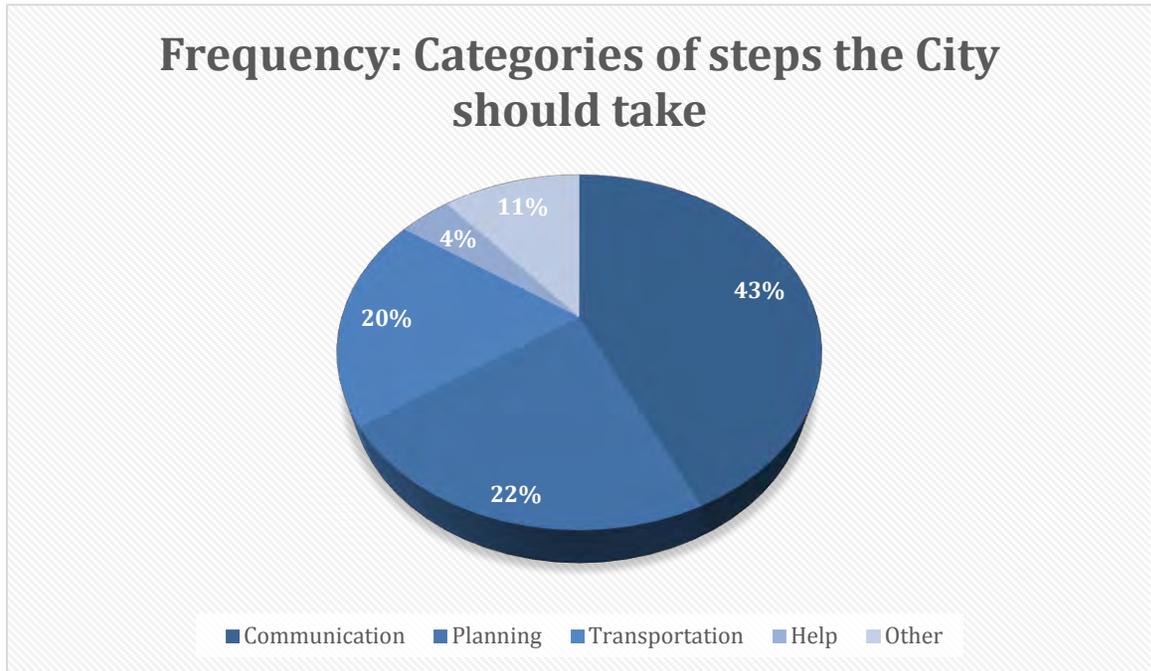
Storms

Severe storms were perceived as a significant challenge due to associated traffic disruptions as well as cleanup costs and property damages. Many long-term residents have had multiple experiences cleaning up and repairing their residential and commercial properties following such weather events.

Extreme temperatures and power losses

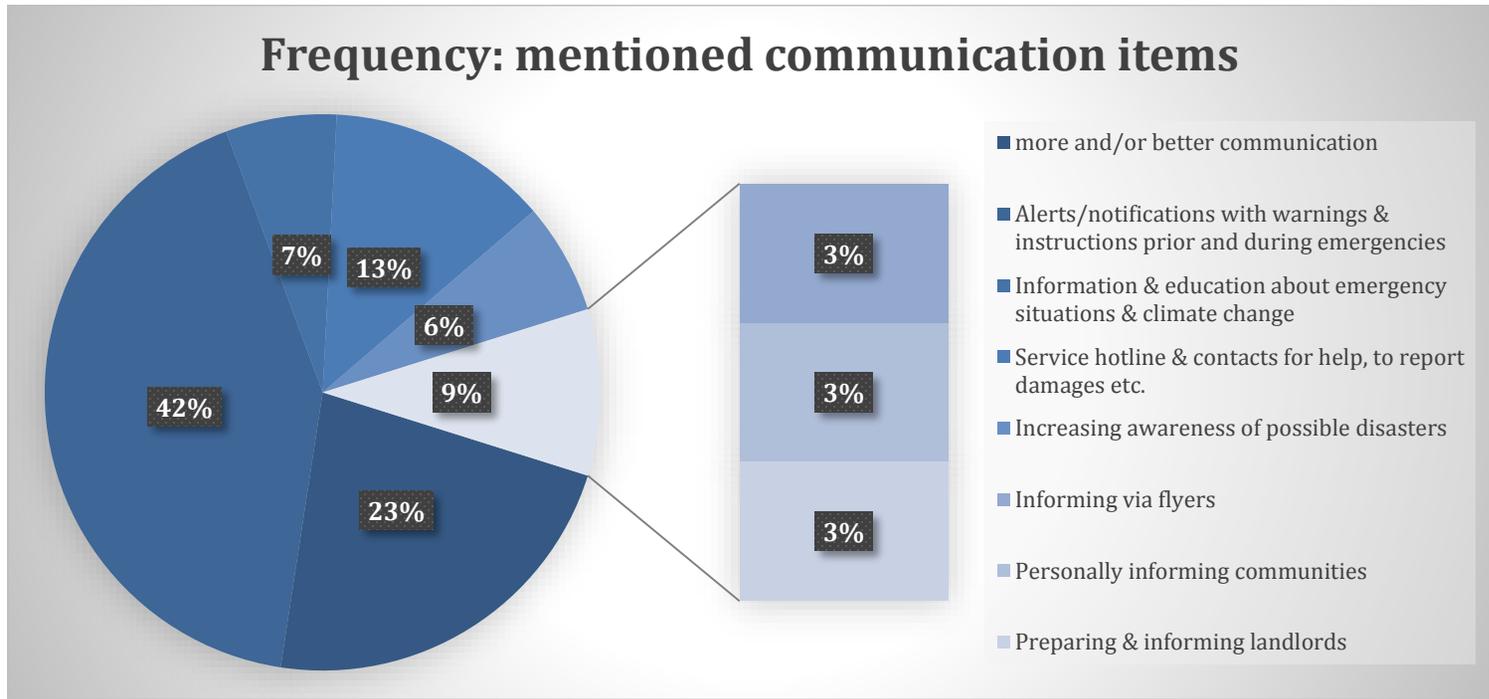
While extreme temperatures and episodic power losses were also cited as serious challenges, no specific reasons for why these two events posed challenges were recorded.

Figure 6.2: In your opinion, what steps could the City of Cambridge take to better support you and your neighbors in the event of a future climate-related disaster?



Dozens of different answers were given to this question and rarely did interviewees suggest similar remedies. However, certain patterns and parallels can be identified. After reviewing the results, we created five categories with two to eight subcategories under which all given answers can be subsumed. It is important to note, however, that these categories are not mutually exclusive. A notable overlap exists between the categories “Communication” and “Planning” since many interviewees mentioned both the preparation of emergency plans and the establishment of shelters and the communication of these plans or locations as necessary steps to be taken.

Figure 6.3: Suggestions for Improving Communication



Many interviewees view disaster preparedness and resiliency planning education and communication as the most important functions the City of Cambridge can carry out. The most common communication effort interviewees felt the City could undertake is the provision of high quality and timely information in the period preceding and during a major climate-related disaster. This communication should focus on the nature of the threat; steps residents, institutional leaders, and business owners can take to protect themselves and others; point of contact in the event they are facing dangerous conditions; and the nature and location of City supported emergency services. A significant number of interviewees felt the City also had a responsibility to disseminate the results of their risk assessment to local stakeholders along with recommended steps they should take to maximize their safety and comfort in the event of a major disaster. Finally, a number of respondents felt the City should, if they do not already, have a hotline number that local stakeholders can call for information before, during, and after a major disaster. Interviewees felt this hotline should be available 24 hours/7 days a week and staffed with individuals fluent in the languages of Cambridge’s major cultural identity groups.

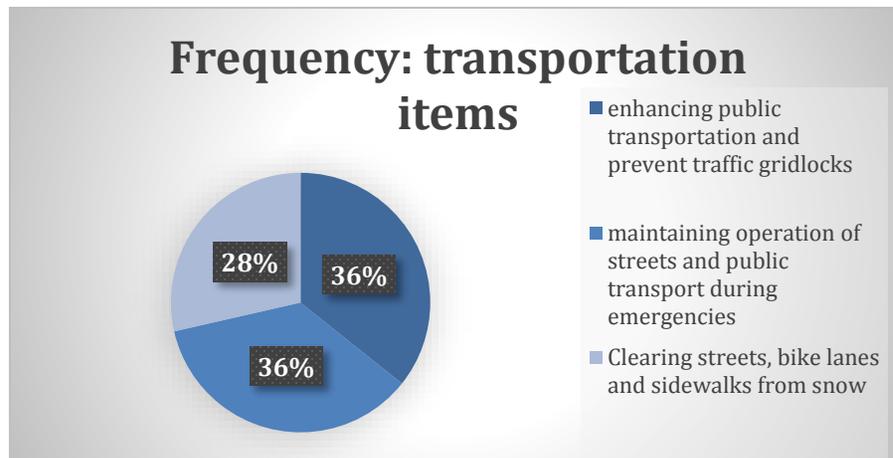
Table 6.4: Suggestions for improving Planning Policy and Practice



Residents were eager to see the findings and recommendations contained in disaster preparedness and climate resiliency plans such as the Alewife District “pilot report” translated into consumer-friendly documents informing local stakeholders of the likely risks they face, steps they should take to protect themselves and their property, lead agency for disaster preparedness and management services, and the nature and location of existing emergency services in the event of a serious disaster. A significant number of residents believed the dominant development pattern being pursued in West Cambridge are reducing the community’s social cohesion and

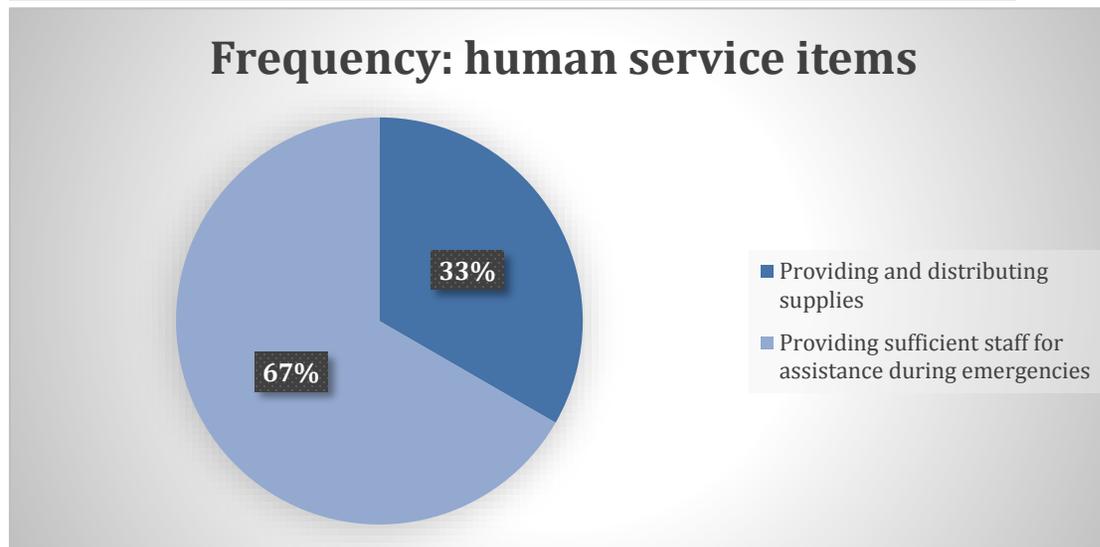
capital undermining its ability to respond to a serious disaster. In addition, already existing problems such as frequent flooding and traffic gridlocks are being exacerbated. These interviewees are unhappy with the degree to which new development features high-rise commercial and residential buildings with few community facilities, such as public playgrounds, community and centers, faith-based institutions, and neighborhood-oriented retail establishments. They were also concerned about the percentage of new residential buildings offering expensive one and two bedroom apartment likely to attract young couples that will remain in these units until their children are of school age when they will relocate to the suburbs resulting in a high level of residential turnover. These interviewees were arguing for a more “mixed-use” land use pattern in which life-cycle housing affordable to Cambridgians and a variety of public spaces and “third spaces” where local residents could get to know one another in order to build the social capital critically needed during disasters.

Table 6.5: Suggestions for Strengthening Disaster-Related Transportation Services



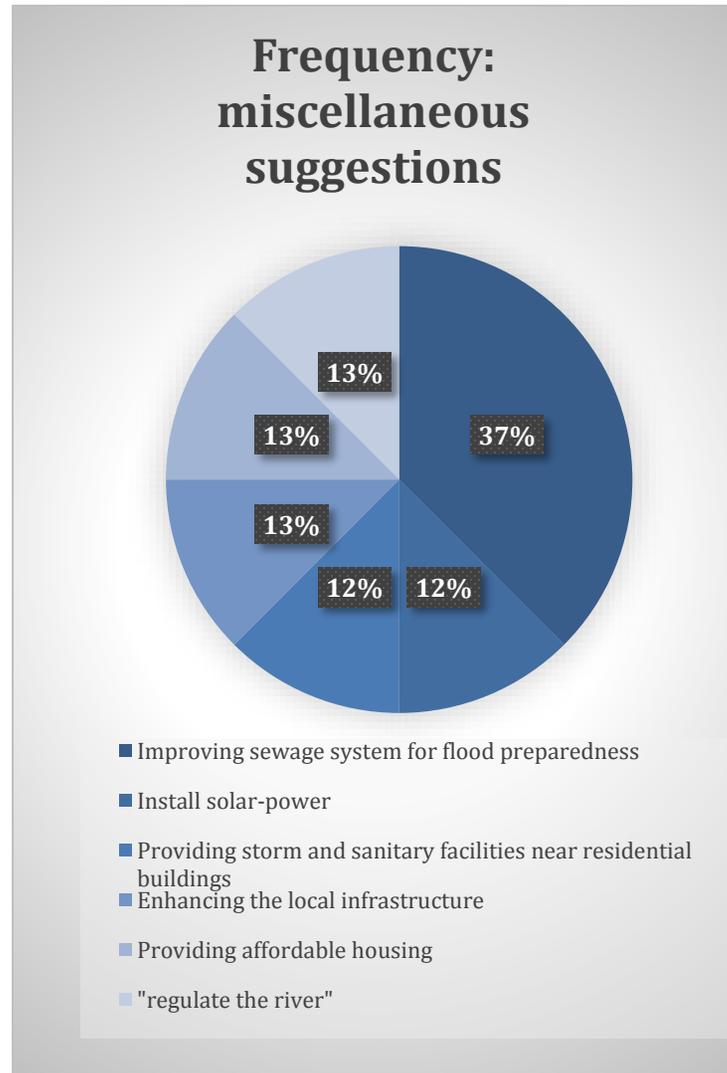
Interviewees also mentioned the importance of improving traffic flow and transportation services to aid in disaster preparedness and management. They advocated the expansion of transportation alternatives to reduce gridlock that complicates movement preceding and during major disasters. They also argued for a continued effort to clear sidewalks, bike lanes and streets during and after winter storms.

Table 6.6: Suggestions for Improving Disaster Related Human Services

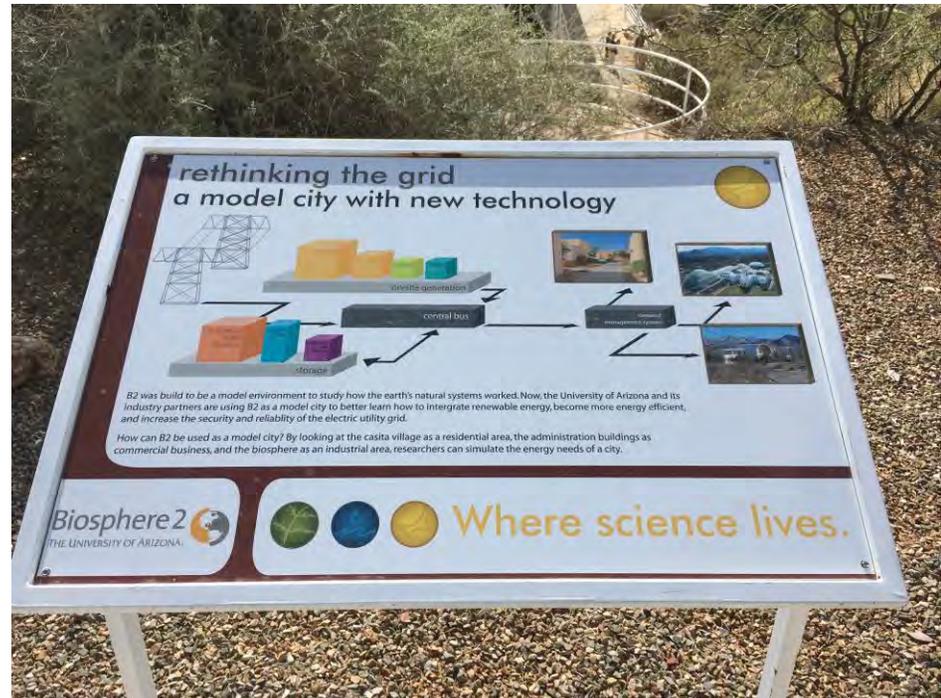


A number of interviewees mentioned the importance of adequately staffing municipal departments and agencies with primary responsibility for disaster preparedness and management. They also suggested pre-positioning essential emergency supplies with local non-profits and faith-based institutions that local residents might turn to during a disaster such as the North Cambridge Senior Center, Jefferson Park Housing Complex, St. James Episcopal Food Pantry, and local firehouses.

Table 6.7: Miscellaneous Suggestions for Improving Disaster Preparedness, Management, and Recovery Services



Finally, residents offered a number of miscellaneous proposals for improving the state of disaster preparedness and community resiliency in the Alewife District. These suggestions included: improving the existing sanitary and storm water systems, expanding green infrastructure to reduce flows into the municipal drainage system, and expanding solar energy generation and storage at publicly supported facilities to insure power during disasters (i.e. microgrid systems).



VII. Summary of Local Stakeholders' Perceptions of Disaster Preparedness and Community Resiliency in the Alewife District

The following observations regarding the City of Cambridge's disaster preparedness, management, and recovery efforts in the Alewife District were repeatedly cited by institutional leaders respondents, focus group attendees, and resident interviewees that the UMass Boston Alewife Planning Team contacted as part of this research initiative. These are widely held perceptions of the state of disaster preparedness in the Alewife District. It is important to remember that these widely-held perceptions of the local state of disaster preparedness may be incorrect.

1. Local stakeholders were very pleased by the City of Cambridge's ongoing efforts to understand future climate-related disaster threats and to formulate workable strategies to address these in order to better protect local residents, their property, and the municipality's vital infrastructure.
2. Local stakeholders were deeply impressed by the City's efforts to gather input from residents, institutional leaders, and business operators who have considerable "first hand" knowledge of the local environment and how it is likely to be affected by the most likely to occur climate challenges.
3. The majority of local stakeholders who participated in this research project have already experienced many of the most likely climate change challenges/disasters identified by the City in their recent risk assessment. They concur with the City's assessment that extreme heat and flooding due to heavy rains are the most serious climate-related challenges/threats likely to confront local residents in the short-run.
4. Local stakeholders have a great deal of confidence in the City of Cambridge's Departments of Public Works, Police, Fire, and Emergency Services ability to effectively and efficiently prepare for the most likely climate-related disasters residents will face in the near-term (now to 2030). This confidence in the capacity of their City government appears to have led some residents to adopt a somewhat more relaxed attitude regarding steps they might take to protect their employees, parishioners, and families.
5. While a slight majority of Alewife residents feel either very or somewhat confident in their ability to manage future climate-change related challenges/disasters, a slightly smaller, yet significant, portion of the Alewife community feels either somewhat or very concerned about their ability to manage future climate-change related challenges/disasters.

6. One of the major concerns local stakeholders had regarding future disaster preparedness and management is the difficulty they would face in using the designated Evacuation Route along the Alewife Brook Parkway to exit the community. Few Alewifians believe that the current Evacuation Route, shared by Boston and Cambridge, would meet the needs of the community. They are eager to see the City work with its neighbors, and regional, state, and federal agencies to explore alternative routes and means of evacuation in the event of a major climate-related disaster.



7. The majority of Alewife residents, institutional leaders, and business owners have not assembled emergency equipment and supplies or prepared alternative disaster response plans in anticipation of a major climate-related disaster.
8. Nor do most Alewife residents currently know where to look for “real time” information in the event of a climate-related disaster. Most said they would tune into their local news station and/or visit the City of Cambridge website to receive accurate information regarding an impending climate-related disaster. Most had not given consideration as to how they would secure important emergency management information in the event of a power outage that affected local electrical and Internet service.
9. Most local stakeholders are unaware of the nature and location of local emergency service centers and are unsure as to who they should contact to secure “real time” information in the event of a serious climate-related disaster.
10. City supported agencies have varied levels of disaster preparedness. Some agencies have clear policies and procedures to follow in case of an emergency but have not trained staff on these issues or organized drills and/or simulations to evaluate how well their employees translate these policies into effective disaster preparedness, management and recovery actions. Other agencies do not appear to have taken any steps towards achieving basic organizational resiliency readiness (i.e. they have no specific disaster plans, have not trained their staff on plan implementation, and have not conducted “drills” to insure seamless implementation).

11. Cambridge appears to have taken strong steps to require non-profit developers seeking assistance from the City to incorporate advanced resilience elements into their buildings. In the absence of dedicated funding for these improvements, these requirements place an additional financial burden on these non-profits. On the other hand, market-rate developers are not required by the City to incorporate similar resiliency elements into their buildings.
12. The City appears to have taken relatively few steps to mobilize the most important group of “first responders” in the event of a major disaster – i.e. Cambridge’s rich network of local churches, human service organizations, fraternal associations, and social networks. Despite the preponderance of empirical evidence that suggests it is precisely these groups that are the first to take action following a major natural and/or man-made disaster, the City has not developed a strategic approach to mobilizing these entities in the event of a major disaster.
13. While schools and churches are two of the most important community-based organizations in the Alewife District little effort appears to have been made to engage them in the disaster planning and community resilience planning process.
14. The City has only recently initiated a public information campaign aimed at informing local stakeholders about the specific climate-related threats they face, steps they should take to prepare for the most likely climate-related disaster events, and whom they should contact and where they should go in the event they believe their lives and/or properties are at risk.
15. The City of Cambridge should consider collaborating with the American Red Cross of Massachusetts to expand the scope of their door-to-door fire prevention campaign to include citizen education on basic disaster preparedness, management and recovery. Emergency “go bags” subsidized by local consumer oriented businesses could be distributed as part of this Red Cross/City of Cambridge “pilot” outreach campaign in the Alewife District.
16. The City of Cambridge should consider asking the Homeowner’s Rehab Inc. and its property management vendor to work with them to organize an annual conference on resiliency planning for Cambridge and nearby communities. HRI and their property management vendor have made remarkable progress institutionalizing advanced disaster preparedness and management strategies into their day-to-day management practices. They are now seeking to incorporate advanced resiliency design features in their future projects. As a local affordable housing provider that has incorporated many of the most advanced resiliency features into their building designs and operations recommended by the Enterprise Community Partners; they would be in a good position to involve this highly regarded national housing intermediary in this conference. Area planning and design schools maybe interested in having their students work with specific Cambridge-based affordable housing producers on the implementation of these ideas as part of their ongoing professional education.

VIII. Strengths, Weaknesses, Opportunities and Threats (SWOT) Analysis

The following two by two matrix highlights the current strengths and weaknesses of the City of Cambridge’s Alewife District Disaster Preparedness and Community Resiliency Planning as well as the future opportunities and threats likely to confront this system as perceived by a cross-section of local stakeholders. The observations within each quadrant of the SWOT Analysis are those that emerged across our various data sets (i.e. institutional interviews, focus groups, and resident interviews). As previously stated, since this analysis is based on local residents’ perceptions of strengths and weaknesses, it may or may not represent actual current strengths and weaknesses of the Alewife District in regards to climate-related disaster preparedness.

Figure 7.1: Preliminary SWOT Analysis of Cambridge’s Disaster Preparedness and Community Resilience Efforts as Perceived by Local Stakeholders

Current Strengths	Current Weaknesses
<ul style="list-style-type: none"> • Quality of DPW infrastructure and street maintenance efforts • Disaster preparedness and management knowledge and skills of CPD, CFD, and CEMS staff → proposal 1 and 2 • Department of Community Development’s ongoing risk assessment and disaster preparedness initiatives → proposal 1 • Environmentally-sensitive changes in zoning, site planning and urban design rules and regulations → proposal 5 and 7 • The City’s strong relationships with nearby communities as well as regional, state, and federal disaster planning and management organizations → proposal 3, 4 and 8 • The extensive network of community-based organizations capable of connecting with and serving many vulnerable individuals and families → proposal 3 and 11 	<ul style="list-style-type: none"> • Limited public awareness of the specific climate-related risks they face now and in the future, of local disaster service providers and centers and resulting lack of disaster preparedness among residents and local businesses → proposal 2, 3, 6, 10, 11 and 12 • Absence of fully-developed disaster preparedness and management plans for many publicly supported agencies in the City (i.e. Senior Citizen Council, Cambridge Housing Authority) → proposal 1 • Limited effort to involve schools and mobilize the City’s extensive network of faith-based, human services, and neighborhood organizations to educate and prepare residents for likely future disasters → proposal 3 and 11 • Gridlock in the Alewife District affecting the movement of residents/emergency service workers before, during, and after disasters → proposal 4 and 5 • An uneven approach to resiliency planning and design – non-profits requiring City support to build affordable

<ul style="list-style-type: none"> • Examples of public agencies and non-profits that can serve as “models” for resiliency-building organizations – CHA and Homeowners Rehab Inc. → proposal 3, 10 and 11 • Recent efforts to integrate local stakeholders’ knowledge into the City’s ongoing comprehensive and disaster planning activities → proposal 3 and 11 	<p>housing must meet design standards that private sector housing developers do not → proposal 8</p> <ul style="list-style-type: none"> • Failure to identify residents of scattered site (affordable housing) as part of the City’s vulnerable population → proposal 12 • Limited effort to encourage local affordable housing, market rate housing, and commercial building developers to adopt “best practices” in resiliency planning and disaster preparedness and management as outlined by U.S. Department of Housing and Urban Development and Enterprise Community Partners → proposal 5, 6, 7, 8 and 9 • Absence of regular (bi-annual) multi-agency drills/simulations of major disaster events to evaluate the extent to which local agencies can translate disaster preparedness plans into effective disaster management and recovery efforts → proposals 1, 3 and 6 • Limited capacity of the City’s Senior Citizen Council hotline – a single telephone line and staff that is not fluent in many of the languages local residents speak → proposal 3
<p style="text-align: center;">Future Opportunities</p>	<p style="text-align: center;">Future Threats</p>
<ul style="list-style-type: none"> • Preparation of resiliency-oriented infrastructure plans in anticipation of a Trump Administration proposed national program to “Rebuild America’s Infrastructure” → proposal 4 • Possibilities for mobilizing the City’s extensive network of community-based schools, churches, and civic groups to identify and assist vulnerable families in preparing and managing likely climate-related disasters → proposal 3, 10 and 11 	<ul style="list-style-type: none"> • Continued upstream development featuring extensive impervious surfaces that will increase the risk of riverine flooding → proposal 5 and 7 • High density residential and commercial development lacking a mix of housing types, open and third spaces and community facilities inhibiting the development of social capital essential to successful resident-led disaster preparedness, management, and recovery → proposal 5 • Increasing stakeholder belief in the City’s ability to handle disaster preparedness, management, and recovery with

- Utilize model disaster preparedness and management plans prepared by select public and non-profit organizations in Cambridge to assist other groups in creating similar strategies → **proposal 3**
- Convene a group of public and private finance experts familiar with public works funding to explore alternative strategies for creating a dedicated pool of resources to assist local non-profit and private developers interested in making their buildings more resilient → **proposal 8**
- Work with the relatively small number of property management companies responsible for the residential and commercial buildings recently constructed and proposed for the Alewife District to develop disaster preparedness, management, and recovery plans for their facilities → **proposal 6 and 7**
- Accelerate the infrastructure improvement plans in the area surrounding the newly-renovated Jefferson Park Housing Complex to maximize the benefits residents can enjoy from the recent upgrading of “campus” infrastructure by the CHA
- Organize a public education campaign to inform local stakeholders of their likely risks, encourage them to acquire emergency equipment and supplies, and develop alternative (scenario-based) emergency response plans → **proposal 2**
- Modest changes in zoning ordinance requiring property owners replacing HAV systems following basement flooding to raise this equipment a safe distance from the floor and install moisture sensors that will shut down the power reducing the threat of fire → **proposal 7**
- Collaborate with the American Red Cross of Massachusetts to expand their door-to-door fire prevention campaign to include citizen education on the basics of disaster preparedness, management and recovery.

the assistance of community-based organizations and informal citizen networks resulting in decreasing preparedness efforts on the household level

- Failure to complement the ongoing regional and national integration of power grids with the establishment of local microgrids to insure essential services in the event of a major regional brownout or blackout
- Cyber-attack on computer-based control systems operating essential elements of our public infrastructure placing people and property at risk
- Serious chemical poisoning caused by the failure of riverside storage facilities following a major climate change-related disaster

Emergency “go bags” subsidized by local consumer oriented businesses could be distributed as part of this Red Cross/City of Cambridge “pilot” outreach campaign in the Alewife District → **proposal 2, 3 and 10**

- Work with the Enterprise Community Partnership to host an annual working conference on building more resilient affordable housing → **proposal 8**

The SWOT Analysis Methods was developed by Stanford Research Institute and further refined by the Harvard Business School to summarize qualitative research findings related to complex urban systems.

IX. Preliminary Proposals for Enhancing Disaster Preparedness and Community Resilience in the Alewife District

The following suggestions for improving disaster preparedness and community resiliency for residents of the Alewife District, especially vulnerable individuals and families, were formulated by the UMass Boston Alewife Planning Team in response to the research findings presented in Sections VII and VIII of this report:

1. The City should consider **surveying the overall state of disaster preparedness** planning and implementation in each of the **City's departments**. Among the questions that might be asked are the following. Does each agency have a senior manager responsible for disaster preparedness and management? Does each agency have an up to date disaster preparedness and management plan that contains policies and procedures for the most likely to occur climate-related challenges/disasters? Are line employees and unit managers' responsibilities and duties in the case of various disasters clearly stated? Has the unit ever conducted a drill and/or simulation to "test" the degree to which staff is able to translate these plans into effective disaster preparedness and management actions? In the event of such plans, policies, training are lacking the City Manager should work with the respective department heads to address these issues.
2. The City should **disseminate specific information** to Alewife area stakeholders regarding the most likely climate-related challenges/disasters they face, the steps they can take to protect their employees, parishioners, clients, families and neighbors; special efforts they can make to support vulnerable individuals and families with special needs during times of disaster; and the nature and extent of local disaster preparedness, management and recovery services.
3. The City should make a concerted effort to **engage local community-based organizations** including public and private schools, colleges and universities, faith-based organizations, fraternal and civic organizations, senior citizen groups, neighborhood associations, and human service organizations in disaster awareness, preparedness, management and recovery education, training, and planning activities. These organizations should be encouraged to identify and contact vulnerable individuals and families that may need assistance in the event of a major disaster. They should be encouraged to develop specific policies, procedures, and protocols to guide their staff and volunteers in reaching out to vulnerable individuals and families before, during, and after major climate-related disaster events to insure their comfort, safety, and wellbeing. The City might also encourage local funders to add questions regarding disaster preparedness and community resiliency efforts to their grant applications to prompt area non-profits to make disaster preparedness and resiliency planning a "taken for granted" aspect of their basic mission (City's CDBG Program, United Way, and Community Fund Applications).

4. The City of Cambridge should work with the City of Boston, its suburban neighbors and regional disaster management officials to explore alternatives to the currently designated **Evacuation Route** along Alewife Brook Parkway that is so often in gridlock.

5. The City should consider re-evaluating zoning in Alewife to encourage a **more varied development pattern** featuring a greater mix of housing types, more open spaces, community facilities, and “third spaces” where local stakeholders can meet and establish relationships that would form the basis of social capital critical to successful resident-led disaster readiness, management, and recovery activities. Most of the recently



constructed residential structures feature 5-6 floors over parking, with the majority of the apartment units containing one and two bedrooms. While these units work for young professionals and couples, a large number of households feel compelled to move when they have children. The often-intense nature of the work these young people perform in area high tech, health care, and university research centers and their short tenure in the neighborhood makes it difficult to build the kind of social cohesion essential to resident-led disaster preparedness, management, and recovery effort. This situation is further complicated by the absence of well-planned public spaces, informal meeting spaces, neighborhood oriented retail, and community facilities such as churches, union halls, community center, etc. As Jane Jacobs, and many subsequent researchers have established – a mix of such uses along properly dimensioned and designed streets represent the essential building blocks of successful neighborhoods and cities.



6. The City should convene a meeting of Alewife **property managers** to engage them in a discussion regarding their current **disaster preparedness and community resiliency practices and plans**; most likely future climate-related challenges and disasters that might affect their buildings; and emerging best practices in resiliency-sensitive facilities management appropriate to Cambridge. The City might partner with the local development, finance, and insurance

communities to organize a bi-annual conference designed to encourage the adoption of best practices in disaster preparedness and resiliency planning by local developers.

7. The City should consider requiring all **developers** of residential and commercial buildings to attach a fully developed **disaster preparedness and management plan** that explicitly addresses support for vulnerable individuals and families in the event of a major climate-related disaster as part to their application for a certificate of occupancy.
8. The City should meet with its State Legislators to explore alternative strategies for creating a **new grant program** to support the non-profit developers seeking to **improve the resiliency of existing affordable housing** buildings or incorporate resiliency features into new affordable housing buildings. This discussion might include the establishment of an affordable housing resiliency tax credit program in which Massachusetts companies would receive a reduction in their corporate income taxes by contributing to an affordable housing resiliency fund.
9. The City should ask local higher education officials to identify and recruit a small group of urban scholars with design, real estate, and insurance expertise to evaluate the impact that various levels of resiliency sensitive design may have on future insurance claims in order to determine whether or not **lower insurance premiums for resiliency-sensitive developers** (market rate and affordable housing) might be justified. The further exploration of ways to improve the City's score in the National Flood Insurance Program's Community Scoring System in order to be eligible for insurance rate discounts of up to 45% could be part of this effort.
10. The City should enlist local businesses, corporations, and foundations to **fund a well-respected non-profit service provider to establish a Resiliency Hub** which would furnish free Emergency Kits (Go Bags) to organizations serving low-income individuals and families; Cambridge Resiliency speakers to educate local stakeholders on the fundamentals of disaster planning and management at the household and individual business scale with focused on underserved communities; loaner air conditioners for low-income families during extended heat waves; referrals for no/low cost pump out services for low-income families living in basement units following flooding events; and transportation to temporary housing for low-income individuals in the event of disaster forcing individuals to abandon their homes.
11. The Resiliency Hub would also work with area churches, schools, and non-profit organizations to **design appropriate strategies for contacting the vulnerable individuals and families** they serve in order to provide the support they might need to prepare for and safely and comfortably survive a major climate-related challenge/disaster. The Resiliency Hub might also serve as a recharging station for those needing to reactivate their cell phones, iPads, and laptops, a pick-up point for those needing transportation out of the area, emergency health clinic in the event of a major disaster, and a district command post where knowledgeable emergency management specialists can be found

to assist individual homeowners, institutional leaders, and business operators with basic disaster preparedness and management decision-making.

12. The City of Cambridge should consider contracting with an area planning school and/or consulting firm to study the provision of case management services and more specifically disaster preparedness and community resiliency planning services and **support to the hundreds of low-income individuals and families living in scattered site affordable housing units** generated by developers City's current under the "set-aside" zoning provision. This is a formerly unrecognized group of vulnerable individuals and families that we currently know little about. Whereas low-income and disabled individuals living in Cambridge Housing Authority or other congregate affordable housing buildings operated by groups such as the Homeowners Rehab Inc. are served by property management and case management staff possessing an intimate knowledge of the special needs of these families, this may not be the case in the City's 89%/11% buildings. Low-income residents of these buildings may also be less able to take advantage of the mutual support that generally exists within well run affordable housing complexes where families get to know one another and, over time, share responsibility for child and elder care and transportation to nearby services.