City of Cambridge

Climate Change Preparedness & Resilience Plan (CCPR)

Alewife Public Meeting

April 12, 2017

KLEINFELDER
Bright People. Right Solutions.

cbi
Consensus Building Institute

Meeting Goals

- Share Alewife area results of vulnerability study
- Describe how the City is developing a resilience plan
- Get input on:
  - Having a prepared community in the Alewife area
  - Key issues to be included in the plan

Meeting Agenda

6:00pm – Welcome

6:10pm – Vulnerability projections for Alewife/Fresh Pond area

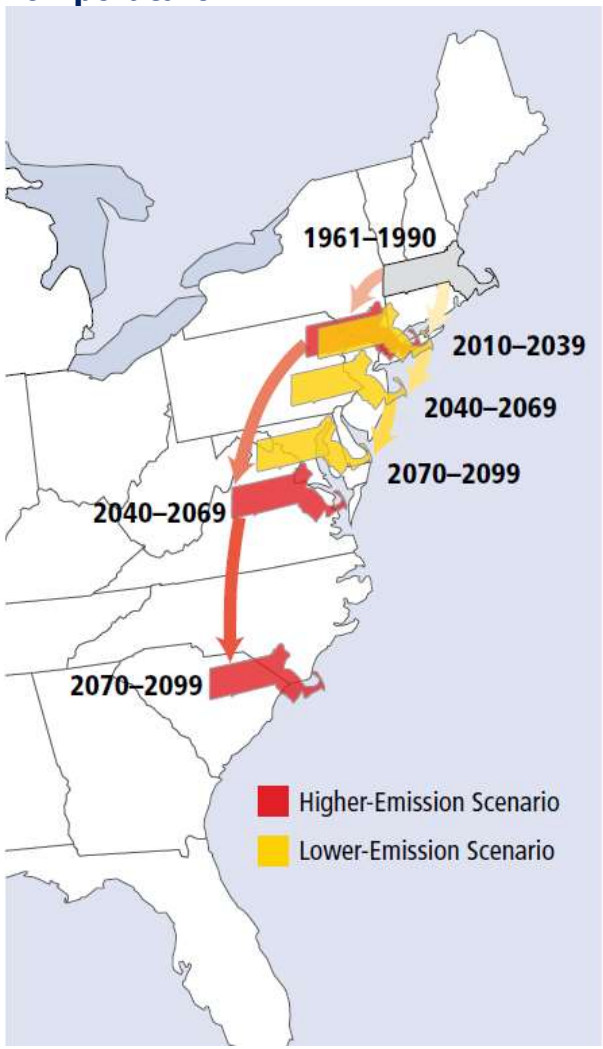
6:45pm – City's approach to identifying resilience strategies

7:15pm – Small group discussions

8:00pm - Adjourn

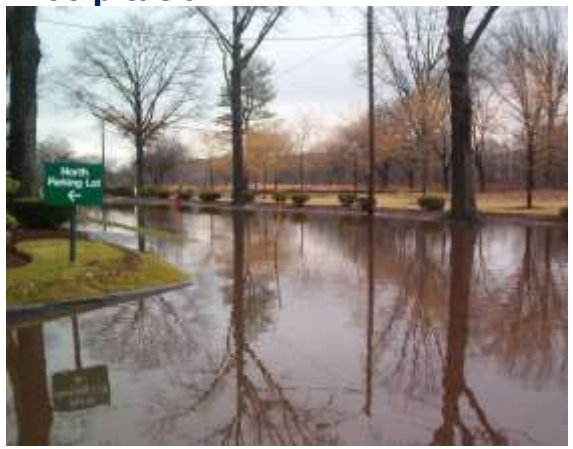
Climate Projections & Key Impacts

Temperature



Source: Army Corps of Engineers

Precipitation



Friends of Alewife Reservation (FAR)

More extreme events

Sea Level Rise (SLR)

Amelia Earhart Dam (Source: MaUSHarbors.com)

Charles River Dam (Source: New England District, US Army Corps of Engineers, 2015)

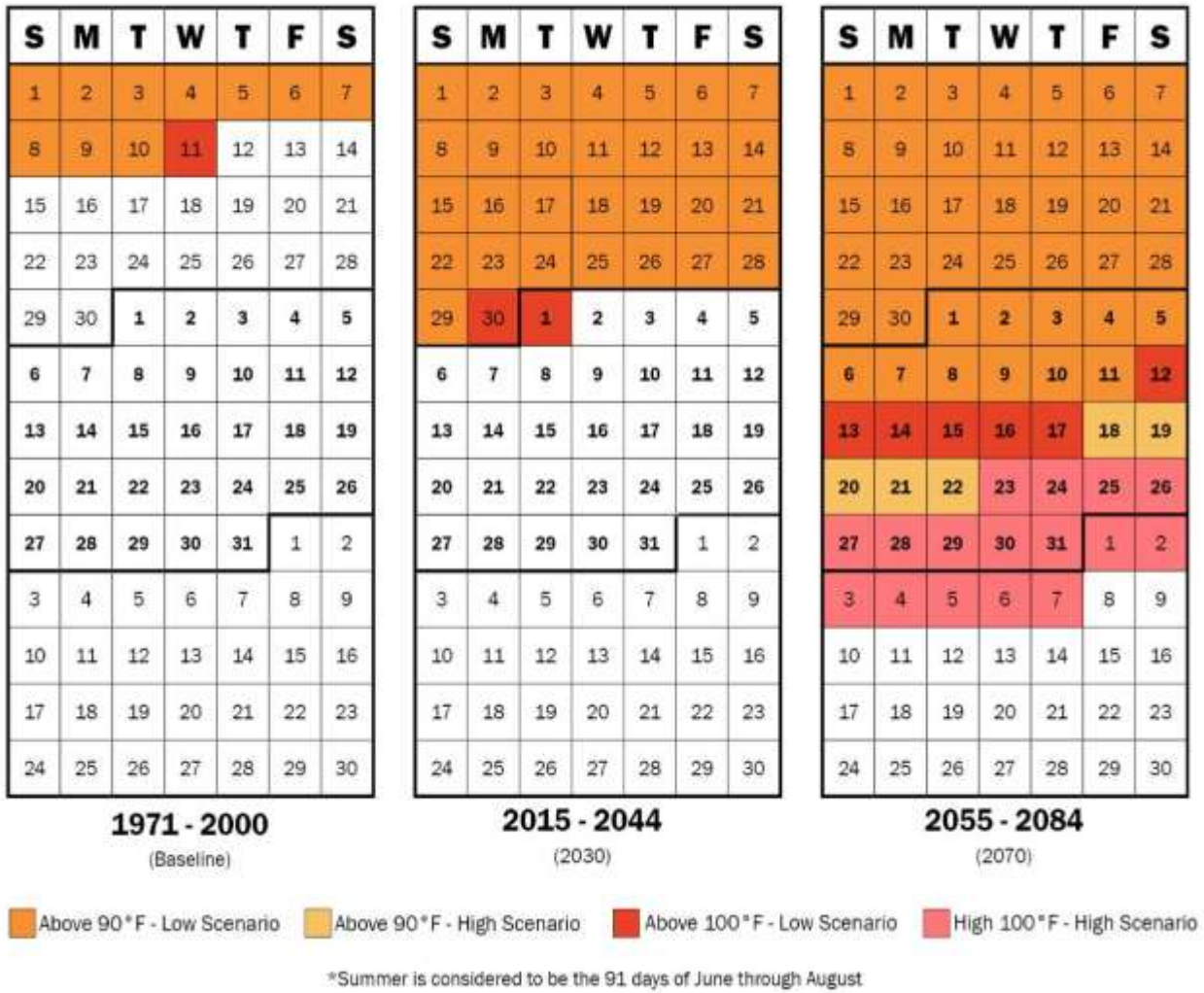
CCVA Key Findings

- **Heat vulnerability** is an imminent and growing risk to the community.
- More frequent flooding contributing to **both poor water quality and indoor air quality** are likely to become increasingly challenging **public health concerns** in the near future.
- **Storm surge flood risk associated with sea level rise** will probably arrive around mid-century and will represent a **new type of flood risk in terms of its source, volume, and salt contamination.**
- Disruption of **critical services and major infrastructure (electricity, transportation, water/wastewater) will have more impact on vulnerable population** who are more isolated due to infirmity, age, or language, and those with lower incomes.
- **Economic losses** from a flood event and/or an area-wide power loss would be significant.
- Many **climate change risks are regional in nature**, particularly SLR/storm surge flooding. Climate disruptions in other communities will impact Cambridge.

*The CCVA assumed no actions are taken. There are **preparedness and resilience actions** that can reduce the city's risk and GHG mitigation can still have an effect toward the end of the century to reduce or delay impacts.*

Increasing Temperatures – Increasing Heat Vulnerability

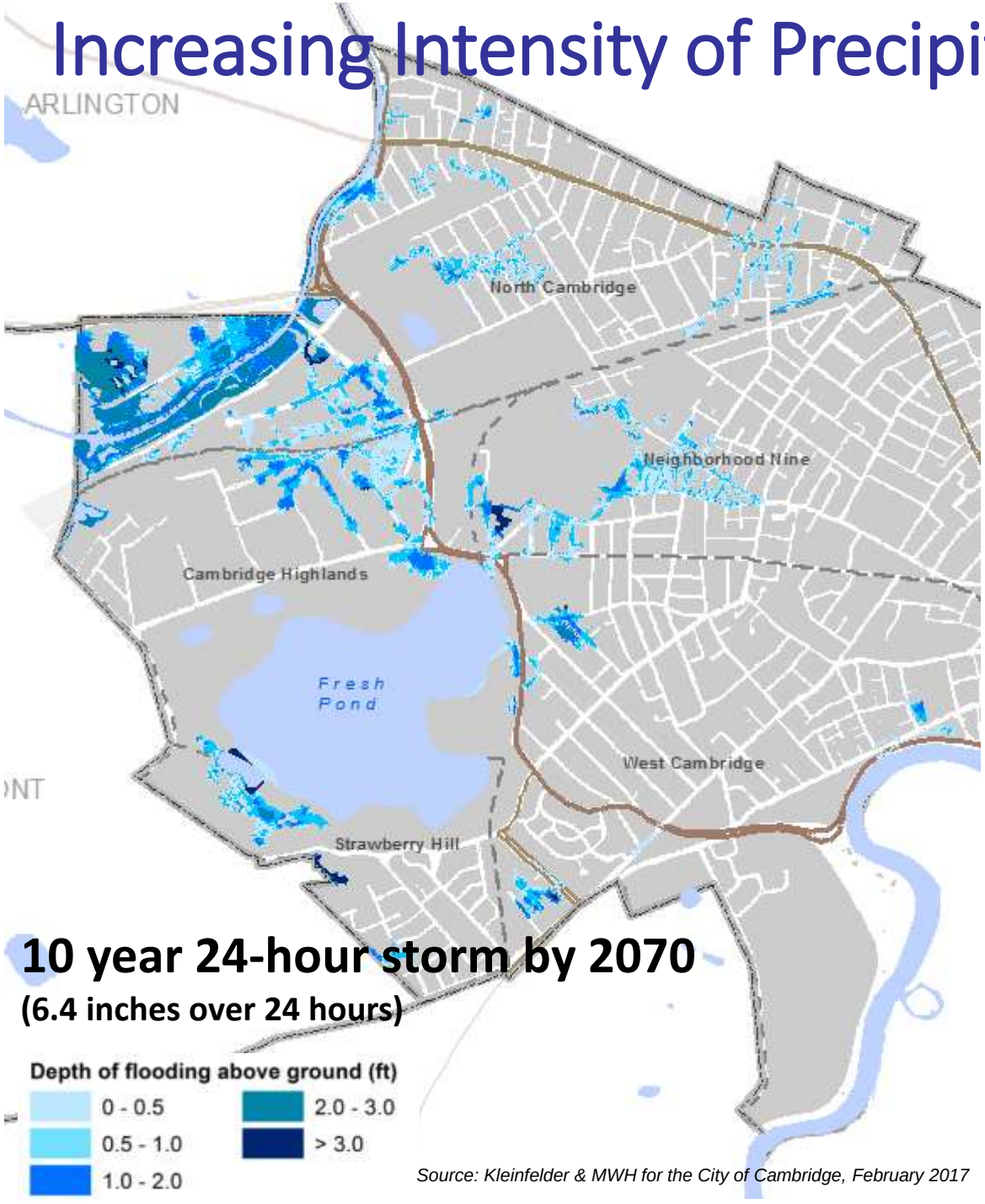
By 2030, the number of days above 90 F could triple



Boston Marathon, April 16, 2012 (above 80F)

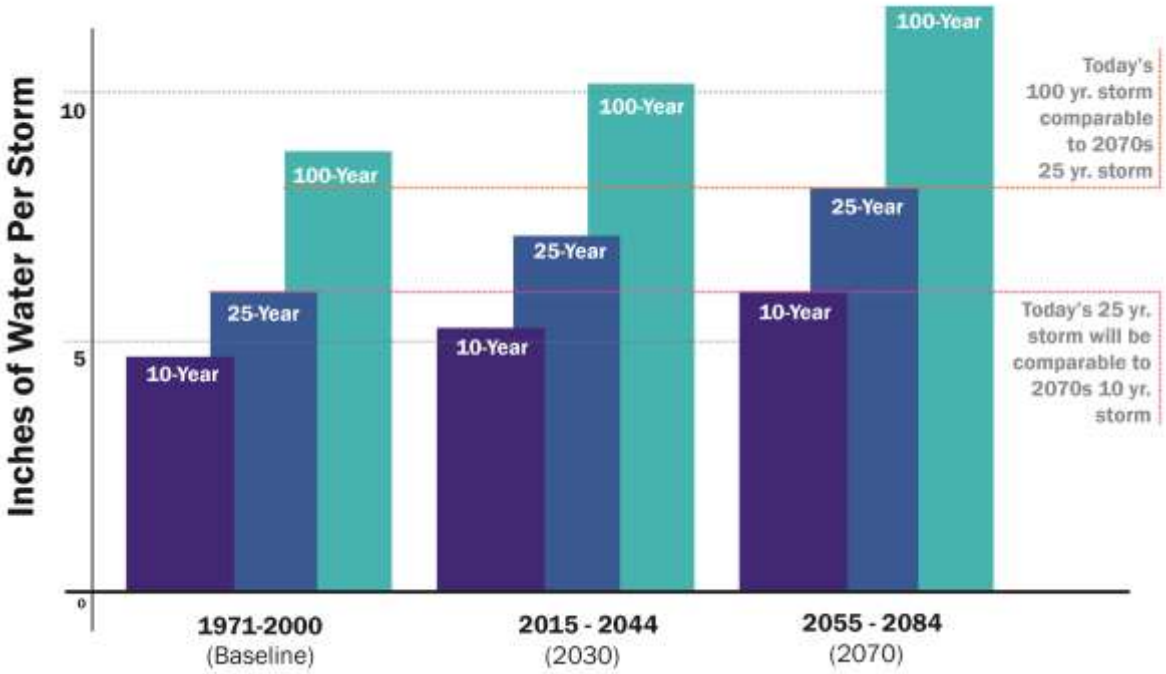
- More frequent & longer heat waves
- Temperatures exacerbated by urban heat island affect
- Extreme hot days will shift most areas from “cautious” for human health to “extreme caution”; Alewife Quad “dangerous”
- Average temps will be warmer

Increasing Intensity of Precipitation - Flooding



10 year 24-hour storm by 2070
(6.4 inches over 24 hours)

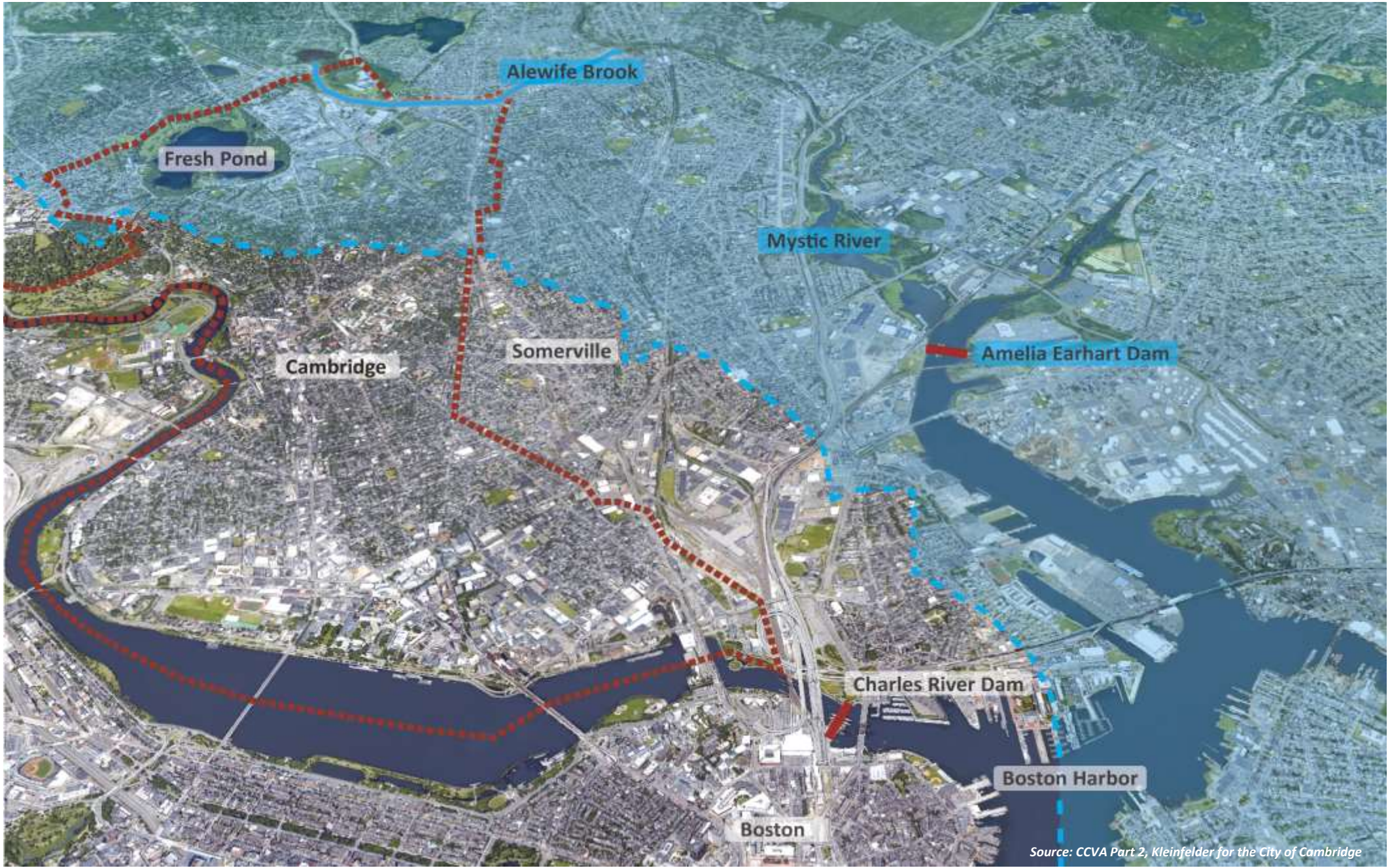
Source: Kleinfelder & MWH for the City of Cambridge, February 2017



Precipitation projections, CCVA Part 1, City of Cambridge
(Source: Kleinfelder based on ATMOS projections, Nov.2015)

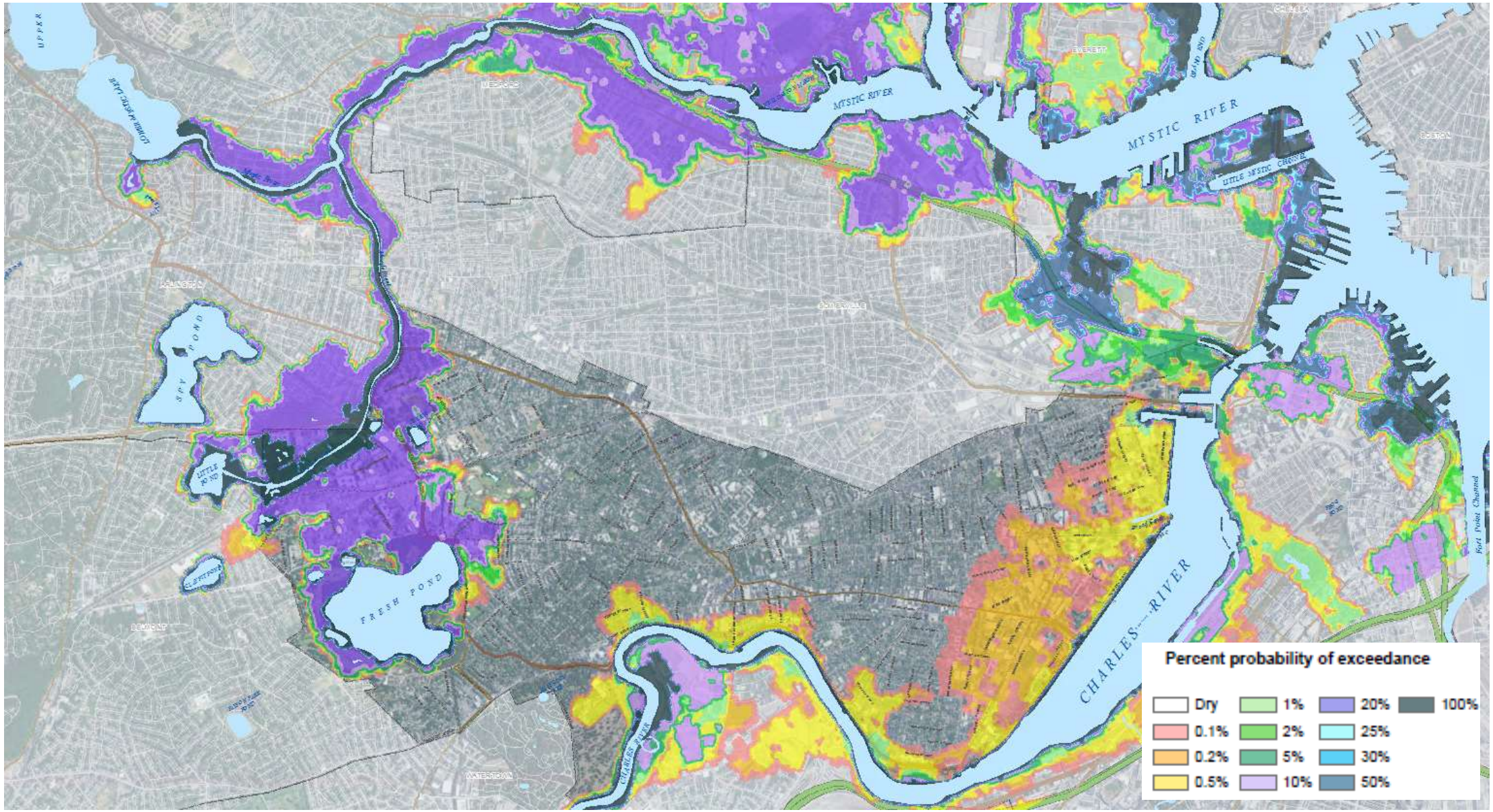
- Rain and snow will fall harder
- More rain and snow in the winter and spring
- Overbank flooding from Alewife Brook will worsen
- Street flooding will worsen

How water flows to Alewife



Source: CCVA Part 2, Kleinfelder for the City of Cambridge

Storm Surges from Boston Harbor will reach Alewife after 2030



Source: Kleinfelder & Woods Hole Group for the City of Cambridge, February 2017

Sea Level Rise/Storm Surge Risk - 2070

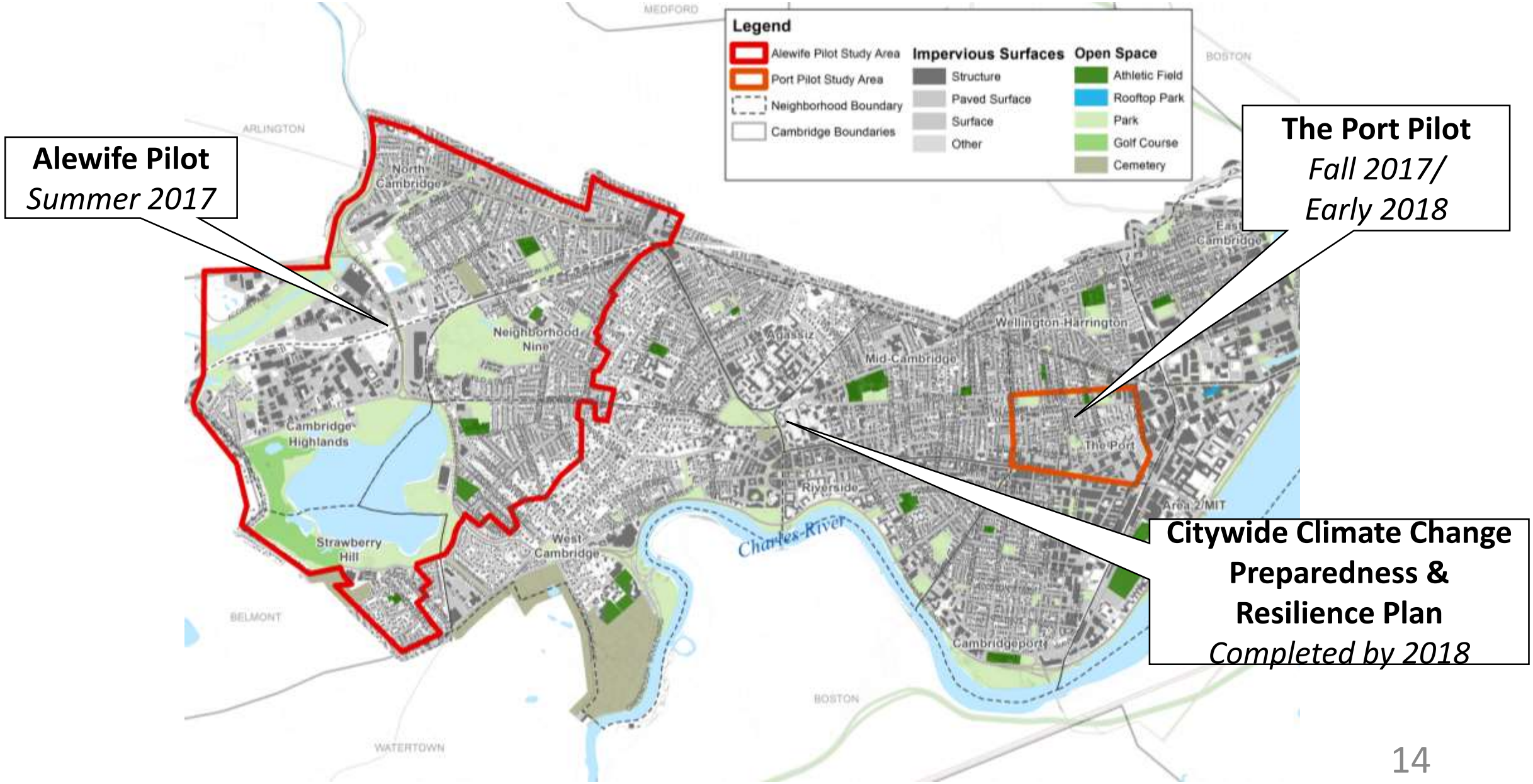
The Alewife Area has many critical assets, resources & vulnerable populations most at risk for CC impacts

Questions and comments about the CCVA findings?

City’s approach to identifying resilience strategies

Integrating Planning Initiatives

Sequence of CCPR Planning

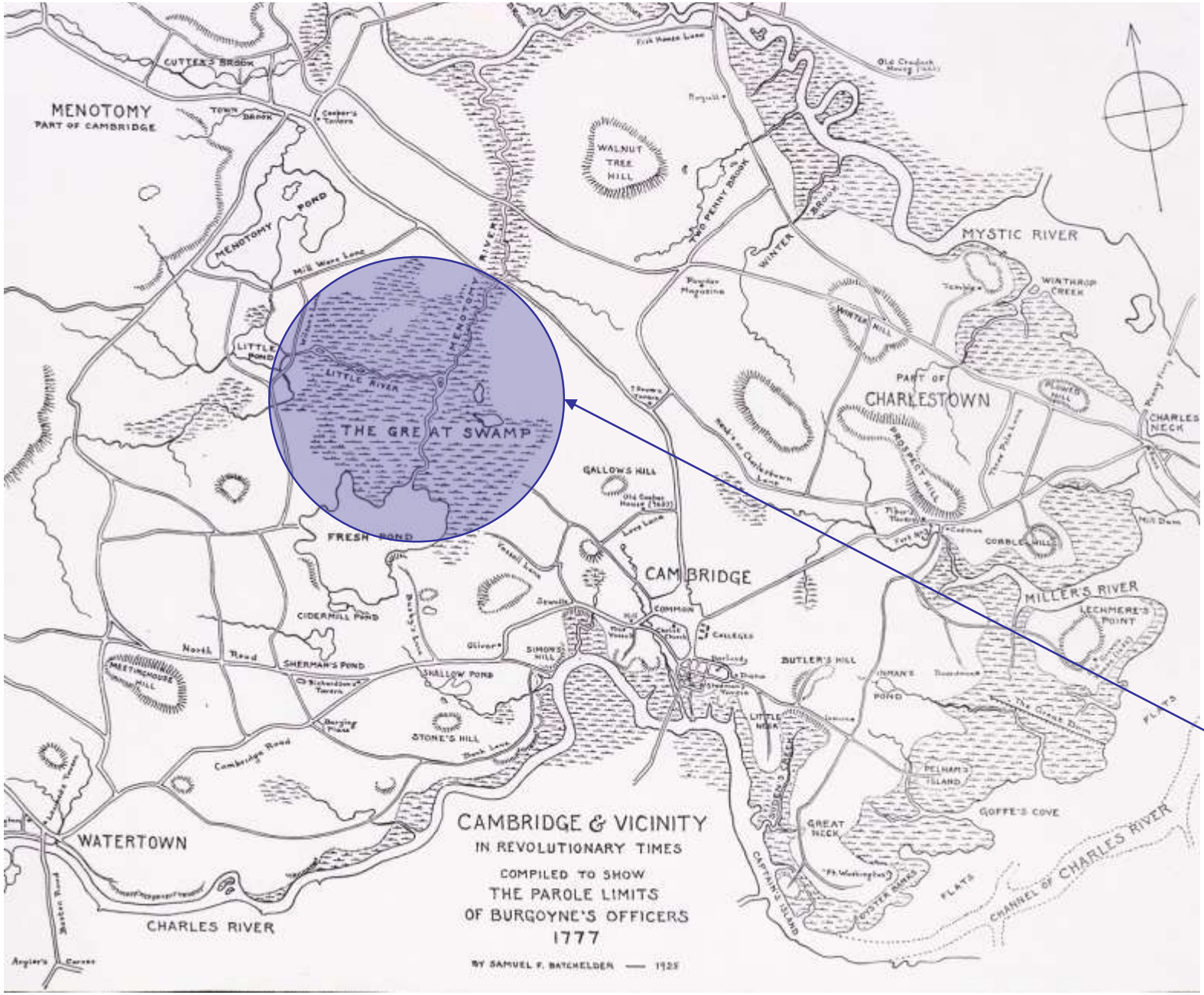


Alewife Pilot
Summer 2017

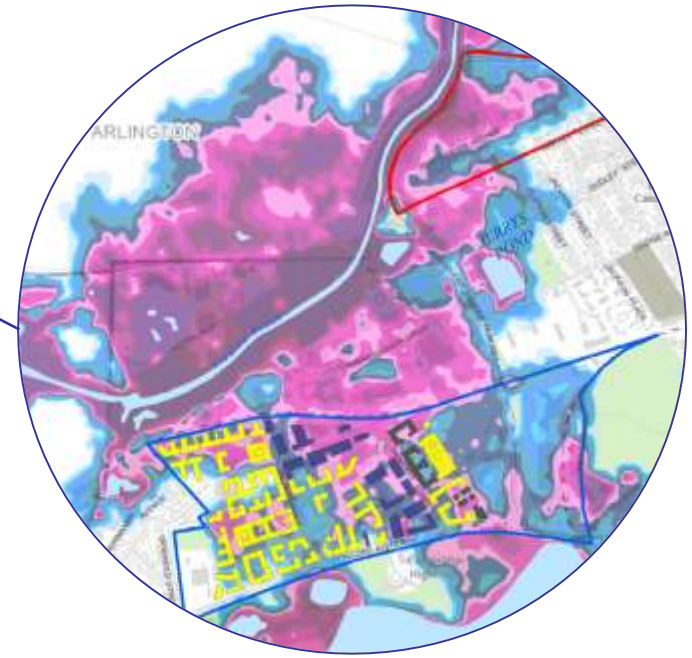
The Port Pilot
Fall 2017/
Early 2018

Citywide Climate Change Preparedness & Resilience Plan
Completed by 2018

Historic Context



Concord Avenue, 1902



The Great Swamp, 1777 (Source: Samuel F. Batchelder Publisher)

1% probability, Projected flooding, SLR/SS 2070

Development Context

Source: Envision Cambridge, Utile

CCPR Vision

The Cambridge Climate Change Preparedness & Resilience Plan will:

Protect the lives and livelihoods of members of the Cambridge community that are at risk from climate change impacts and, in the process, enhance the well-being of the Cambridge community.

Preparedness activities since Summer 2015

- Providing flood risk guidance to developers
- Public education and outreach
- Metro Mayors Climate Change Preparedness Task Force – 14 cities and towns
- Engaging with state agencies – EOEEA, MBTA, Mass DOT, DCAMM
- Public health / climate change engagement
- NOAA grant submission for regional flood resilience

Building's flood protection:

1. Use Flood Resistant Materials
2. Build Exterior Floodwalls
3. Install Backwater Valves
4. Elevate/ Relocate Utilities

Resilience Strategies

A **A Prepared Community**: Strategies to strengthen community, social, and economic resilience.

B **Adapted Buildings:** Strategies to protect buildings against projected climate change impacts.

C **Resilient Infrastructure:** Strategies to ensure continued service or a speedy recovery from community-wide infrastructure systems.

D **Resilient ecosystems:** An enhanced living environment integrating air quality, waterways, green infrastructure, and the urban forest as a system resilient to climate impacts.

Evaluation Criteria

- **Impact***:* Is the strategy technically effective?

- **Affordable:** Is the implementation cost feasible?

- **Equitable:** Will the strategy be fair to all?

- **Wellness:** Will the strategy improve public health and safety?

- **Feasible**: Is the strategy politically, legally, and financially realistic?

- **Integrated**: Is the strategy aligned with Net Zero & Envision?

- **Sustainable**: Does the strategy mitigate climate change?

A Prepared Community

Strategies to strengthen community, social, and economic resilience.

- Prepare businesses and workplaces for climate stresses to ensure continuity and rapid recovery
- Prepare for extreme events with emergency planning
- Build stronger social networks and self-reliance
- Educate and train residents to prepare for climate stresses
- Develop support systems for vulnerable populations
- Develop resilient communication networks
- Examples:
  - Create emergency and disaster hubs
  - Create “cool” cooling centers

B Adapted Buildings

Strategies to protect buildings against projected climate change impacts.

- Strategies to build to flood projections or recover from extreme flood events.
- Livable buildings to sustain warmer climate and extreme heat events.
- Examples:
  - Retrofit existing building/parcel for enhanced flood protection
  - Design buildings that can adapt to projected temperature increases
  - Design buildings to incorporate energy autonomy

MLK School, Perkins Eastman, 2015

70 Fawcett Street, Cambridge

C Resilient Infrastructure

Strategies to ensure continued service or a speedy recovery from community-wide infrastructure systems.

- Adapt infrastructure systems in the City to be in operation for a new normal for higher temperature and short duration flooding
- Prepare for extreme events with speedy recovery for restoration of infrastructure systems
- Examples:
  - Continue sewer separation in Alewife area to reduce adverse public health impacts
  - Protect the Fresh Pond Reservoir as one of the City's potable water resource

D Resilient Ecosystems

an enhanced living environment integrating air quality, waterways, green infrastructure and the urban forest as systems resilient to climate impacts.

- Provide for the City's ecosystems to maintain and enhance living quality as for example air quality, water quality and mitigating extreme temperature.
  - Implement green infrastructure to improve water quality and reduce flooding for smaller rainfall events
  - Reduce Urban Heat Island (UHI) effect
- Examples:
  - Expand urban tree canopy
  - Reduce impervious surfaces & surfaces with high heat absorbance

North Point Park

B Adapted Buildings

Strategies to protect buildings against projected climate change impacts.

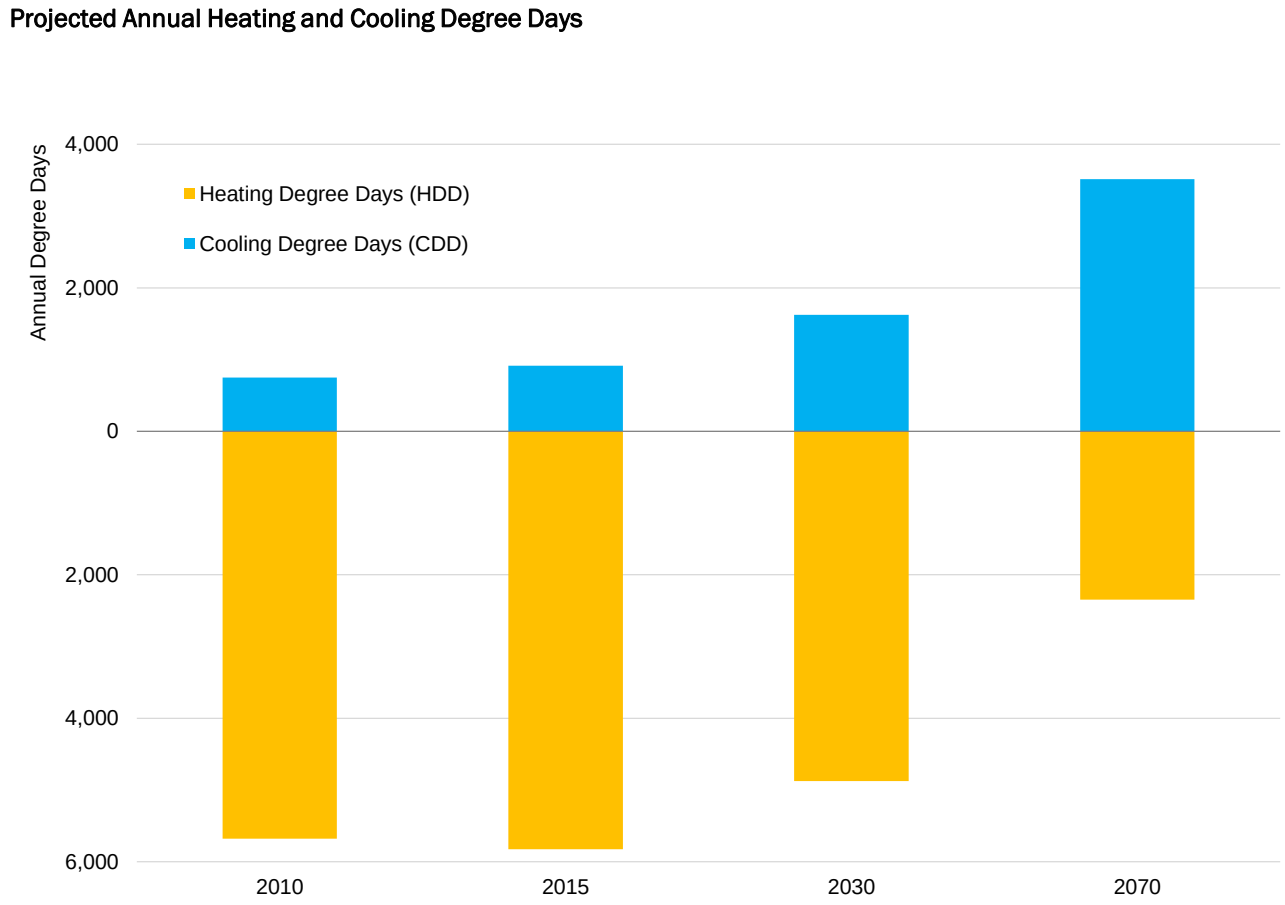
Examples:

- Retrofit existing building/parcel for enhanced flood protection
- Design buildings that can adapt to projected temperature increases
- Design buildings to incorporate energy autonomy

Adapted buildings for heat

Build/ retrofit:

- Increased insulation
- Maximization of passive cooling and ventilation
- Energy autonomy for critical systems
- Energy efficient cooling



Source: Petri, Y. and Caldeira, K. Impacts of global warming on residential heating and cooling degree-days in the United States (2015), and BuroHappold analysis

Design buildings that can adapt to projected temperature increases

Existing Buildings

- Re-insulation and air sealing
- Window replacement
- Window films (low-e)
- Exterior window shading
- Reflective roofing materials

New Buildings

- Passive design strategies
- High performance envelope requirements

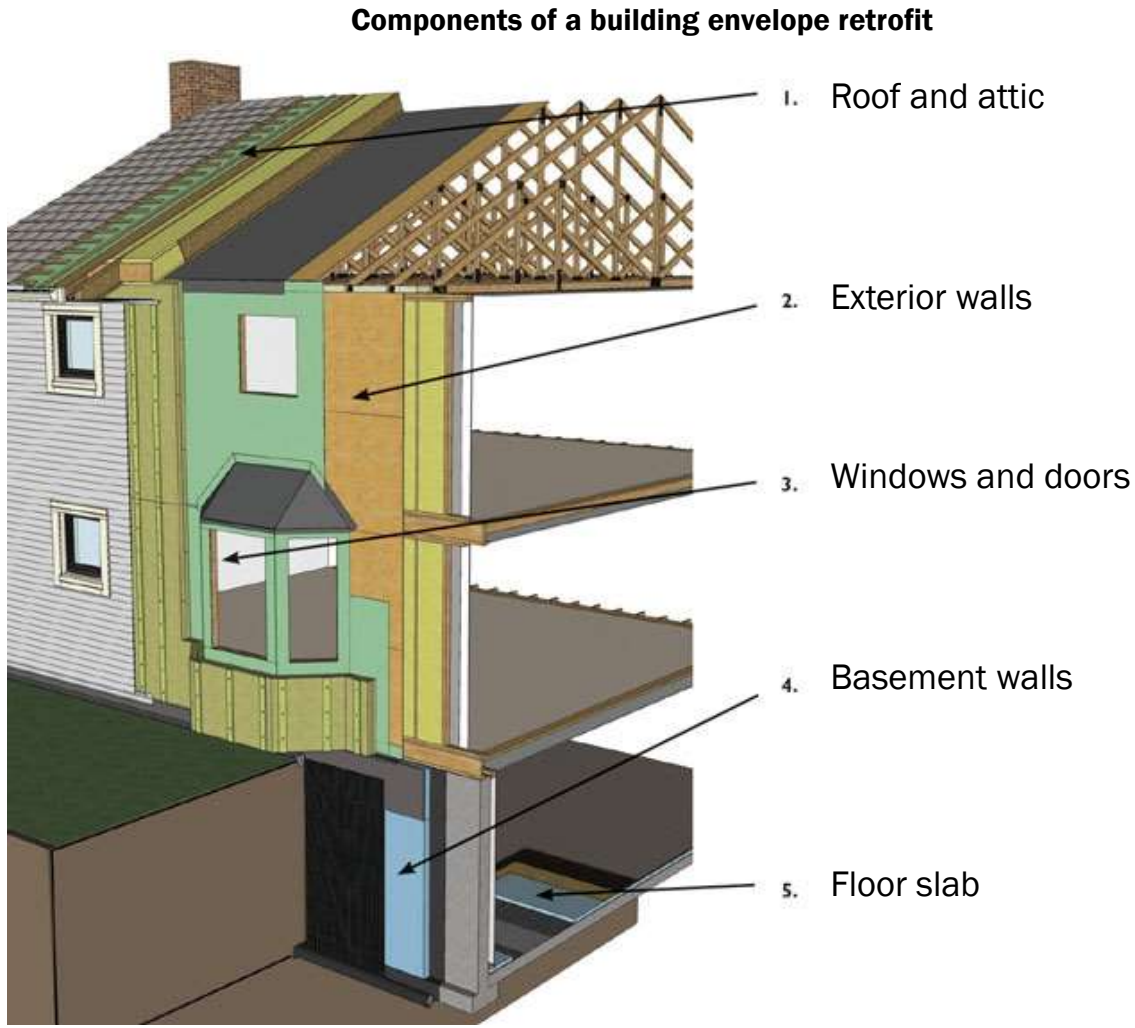


Image Source: Canada Mortgage and Housing Corporation

Adapted buildings for flooding

Flood Elevation Legend (feet-CCB):

2070 100 YR SLR/SS = 22.5’

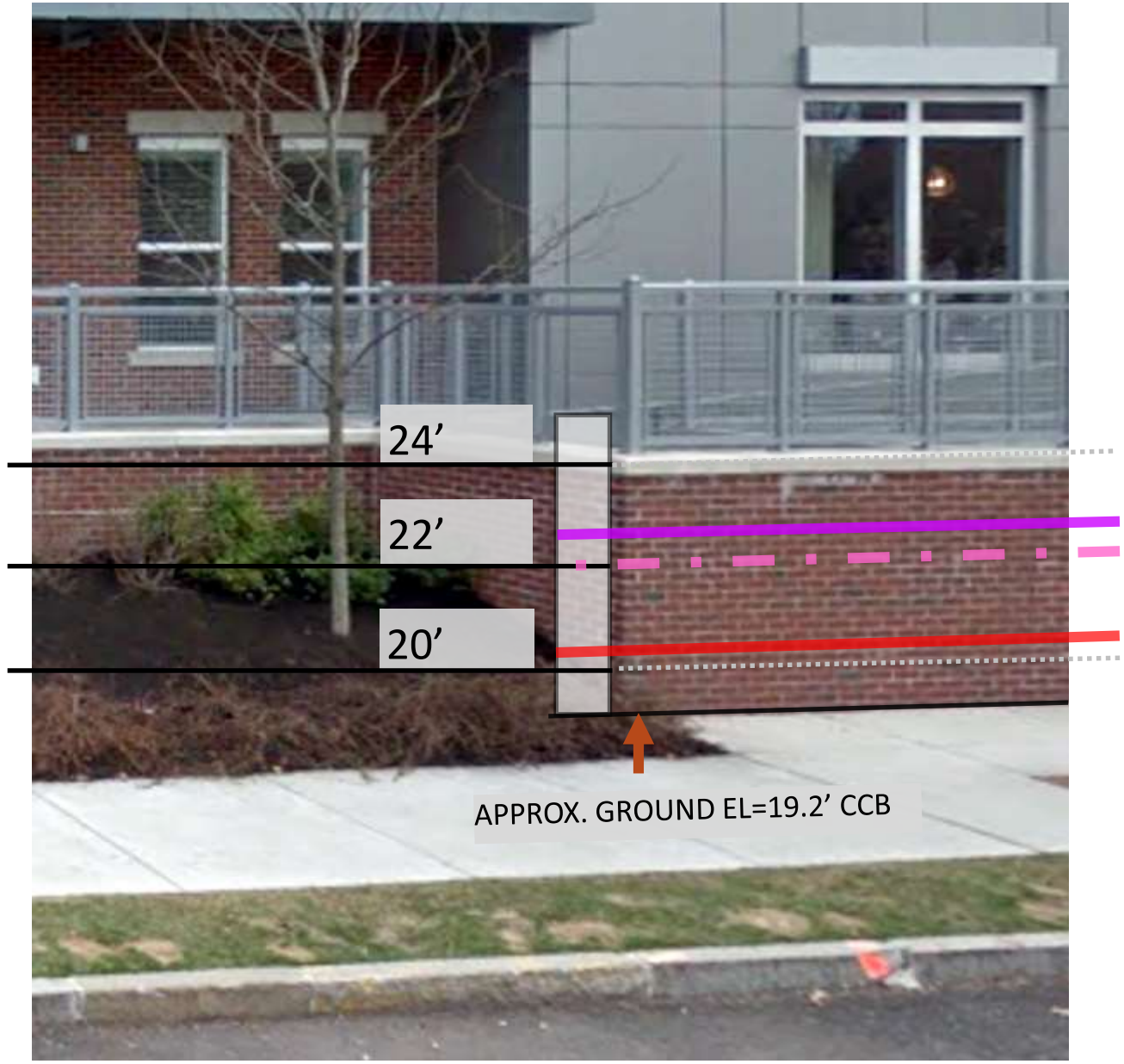
2070 10 YR SLR/SS = 22.0’

2070 100 YR PRECIP = 20.3’

FEMA 100 YR = DRY (18.7’)

70 FAWCETT ST. FLOOD ELEVATIONS

Build to protect from 2070 flood risk from precipitation and SLR/Storm Surge



Fawcett Street, Cambridge

Retrofit existing building/ parcel for enhanced flooding protection

GI Storage Options:

1. Bioretention Basin
2. Rain Barrel
3. Above-Ground Planter
4. Other GI Storage Options

Building's flood protection:

1. Use Flood Resistant Materials
2. Build Exterior Floodwalls
3. Install Backwater Valves
4. Elevate/ Relocate Utilities

Source: City of Cambridge

A Prepared Community

Strategies to strengthen community, social, and economic resilience.

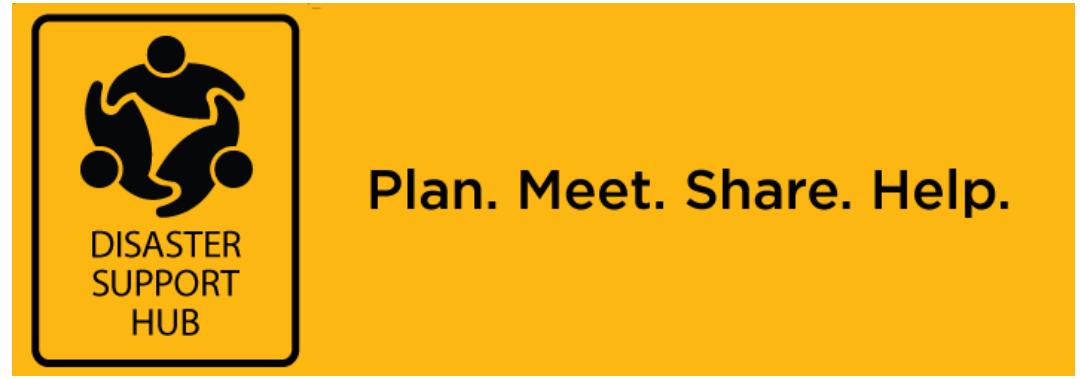
Examples:

- Create emergency and disaster hubs
- Create “cool” cooling centers

Create Resilience Hubs

Based on models in Vancouver, San Francisco, and elsewhere:

- Resiliency Education and Training
- Disaster Preparedness and Climate Resiliency Planning.
- Disaster Simulation Exercise
- Emergency Alert System
- Expansion of Emergency Service Center
- Pre-position emergency supplies
- Clean energy technical assistance



Create “cool” cooling centers; i.e., places where people would want to go to and hang out.

Explore new ideas, for example:

- Partner with Community organizations to engage through existing programming
- Establish a city-wide contest on how to make cooling centers more attractive and useable
- Partner with the Cambridge Mayor’s Summer Youth Employment Program to work with city agencies to develop educational outreach programming.
- Engage facility owners such as halls, theaters, and other venues to serve as cooling centers

Small group discussion on Prepared Community

Question 1

In a situation of increasing disruptions who would people in Alewife turn to for help? What strong social networks exist already in the Alewife / Fresh Pond area? What else would strengthen the Alewife community?

Question 2

What issues related to climate change resilience in the Alewife area are of most concern to you, your family, and your neighbors?

Instructions

Talk with the people at your table and discuss the two questions.

PLEASE

- Manage time so you get to both questions.
- Give everyone a chance to share their thoughts on each question.
- Remember you do not all have to agree, the purpose is to hear everyone's reflections and ideas.

Someone will be facilitating and taking notes at each table. The content of those notes will be included in the meeting summary.

Next Steps

Thank you!