



## WHAT IS AT RISK?

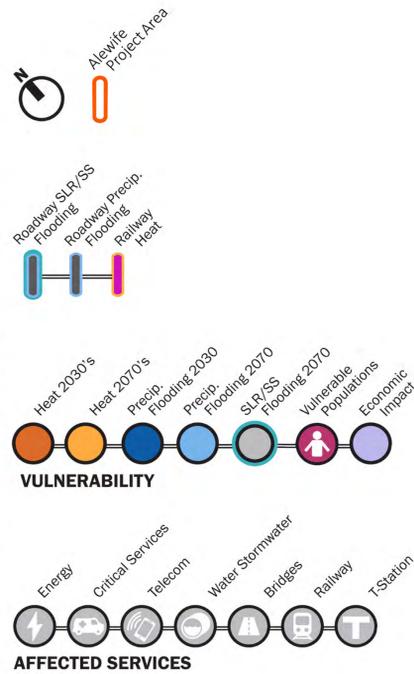
The **Alewife area** serves as the regional hub for several key infrastructure systems, such as **energy transportation and water**. Several of these key critical assets are likely to experience **increased flooding** and impacts from **prolonged heat waves** in the **future**.

KEY CLIMATE CHANGE PHYSICAL AND SOCIAL VULNERABILITIES

ALEWIFE'S MOST AT-RISK INFRASTRUCTURE ASSETS



[SOURCE: CCPR, 2017]



Asset	CCVA Risk				
	Heat		Flood		
	2030	2070	2030	2070	SLR/SS
Energy					
North Cambridge Substation					
Brookford Street Take Station - natural gas					
Roadways and Bridges					
Alewife Brook Parkway					
Massachusetts Ave					
Fresh Pond Parkway / Route 60					
Alewife Brook Parkway at Rt.2 and Mass Ave /Rt.16					
Concord Turnpike / Route 2					
Transit					
Alewife Station (Red)					
Alewife - Davis - Porter Rail Line (Red)					
Fitchburg Commuter Rail Line					
Water					
New Street Pump Station					
Fresh Pond Reservoir					
CAM 004 (Alewife, Separated)					
CAM 400 (Alewife, Separated)					
CAM 001 (Alewife, CSO)					
D46 (Alewife, Separated)					
Alewife Brook					
CAM 002/002A (Alewife Combined)					
CAM 401 A/B (Alewife Combined)					
Critical Services					
Professional Ambulance Services					
Water Department Bldg. / City's Emergency Operations Ctr.					
Telecom					
BBN Technologies data hub					
Concord Ave Antenna Tower					

[SOURCE: CCVA PART 1, 2015 & 2, 2017]

## WHAT ACTIONS ARE ALREADY BEING TAKEN?

- Raised southernmost hummock in Fresh Pond community gardens
- Combined sewer separation projects
- New development has to meet stringent stormwater storage requirements for present day storm
- MassDOT, MBTA are performing vulnerability assessments for their assets in Cambridge
- Transmission redundancy for Cambridge substation
- Concept plan for watershed scale flood management at a regional scale

## WHAT ARE OTHER CITIES DOING?



[SOURCE: REBUILD BY DESIGN]

### THE BIG U - NEW YORK CITY, NEW YORK

This project involves installing flood barriers around 3 sections of the City. It also aims to make protective measures one of the City's attractions by offering waterfront access for leisure along one berm, constructing an educational facility where visitors can observe tidal variations and sea level rise behind another berm, and adding deployable floodwalls.



[SOURCE: RAMBOLL STUDIO DREISEITL]

### CANAL STREETS - COPENHAGEN, DENMARK

Canal streets use lowered street profiles that form a flood pathway or corridor, directing stormwater away from public spaces. Abutting open spaces and bio-retention basins aligned with streets also contribute to store some excess stormwater if the corridors overflow due to a heavy rainfall event.



[SOURCE: THE MIAMI HERALD]

### RAISED STREETS - MIAMI, FLORIDA

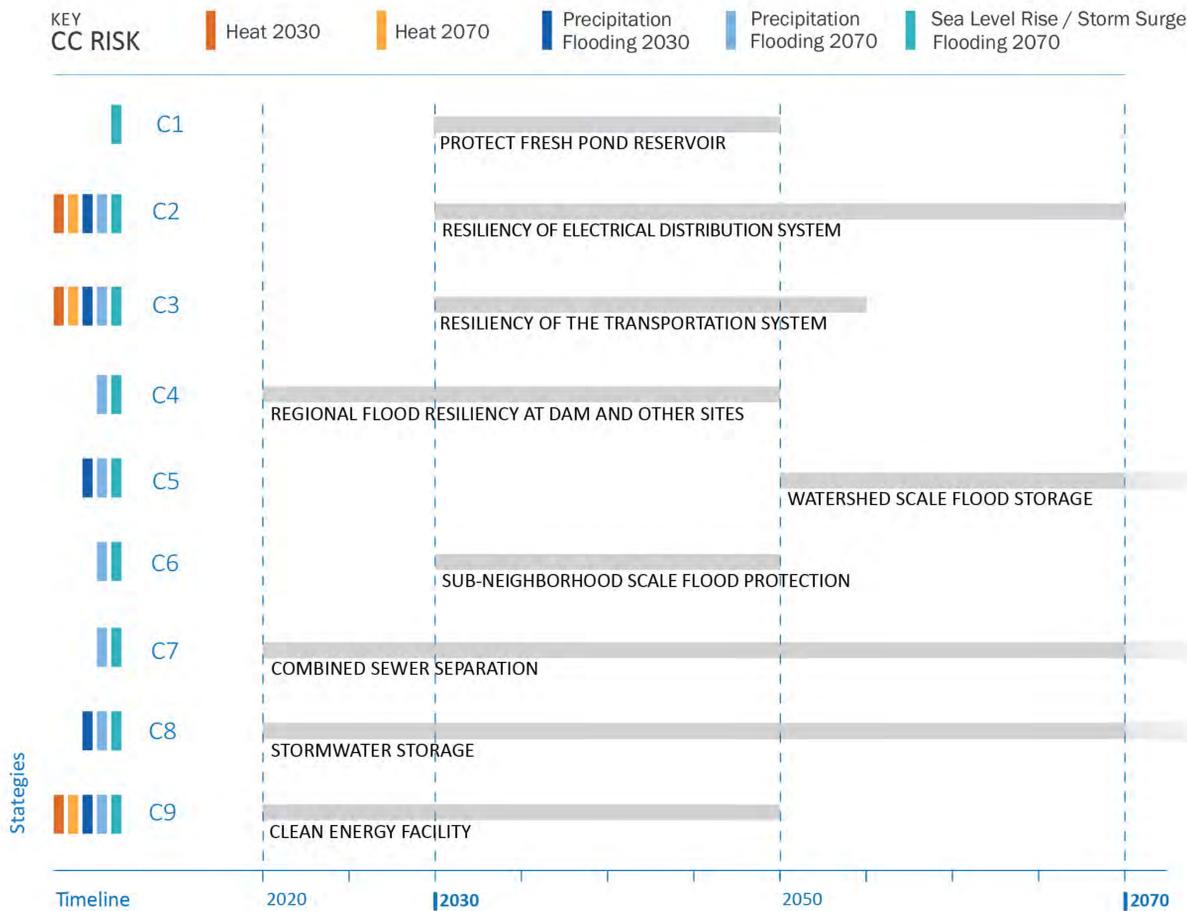
Miami, Florida, is making efforts to elevate streets to protect the community from rapidly increasing sealevel rise/storm surge impacts. This approach protects the roadways and requires redesigning buildings' accesses to adjust to the higher street elevations.



# CLIMATE CHANGE PREPAREDNESS & RESILIENCE (CCPR) PLAN RESILIENT INFRASTRUCTURE



## TIMELINE



To prepare **Resilient Infrastructure** for **climate change**, there are 9 strategies the City is focusing on. These strategies range from **parcel to regional-scale solutions** for **protection** of critical infrastructure and mitigation of the negative impacts from both **SLR/SS and precipitation flooding**.

### ADD YOUR STICKERS TO THE TABLE BELOW



Which strategy is most important for **your household (or work)** in terms of resiliency?



Which strategy is most important for the **Alewife Neighborhood** in terms of resiliency?

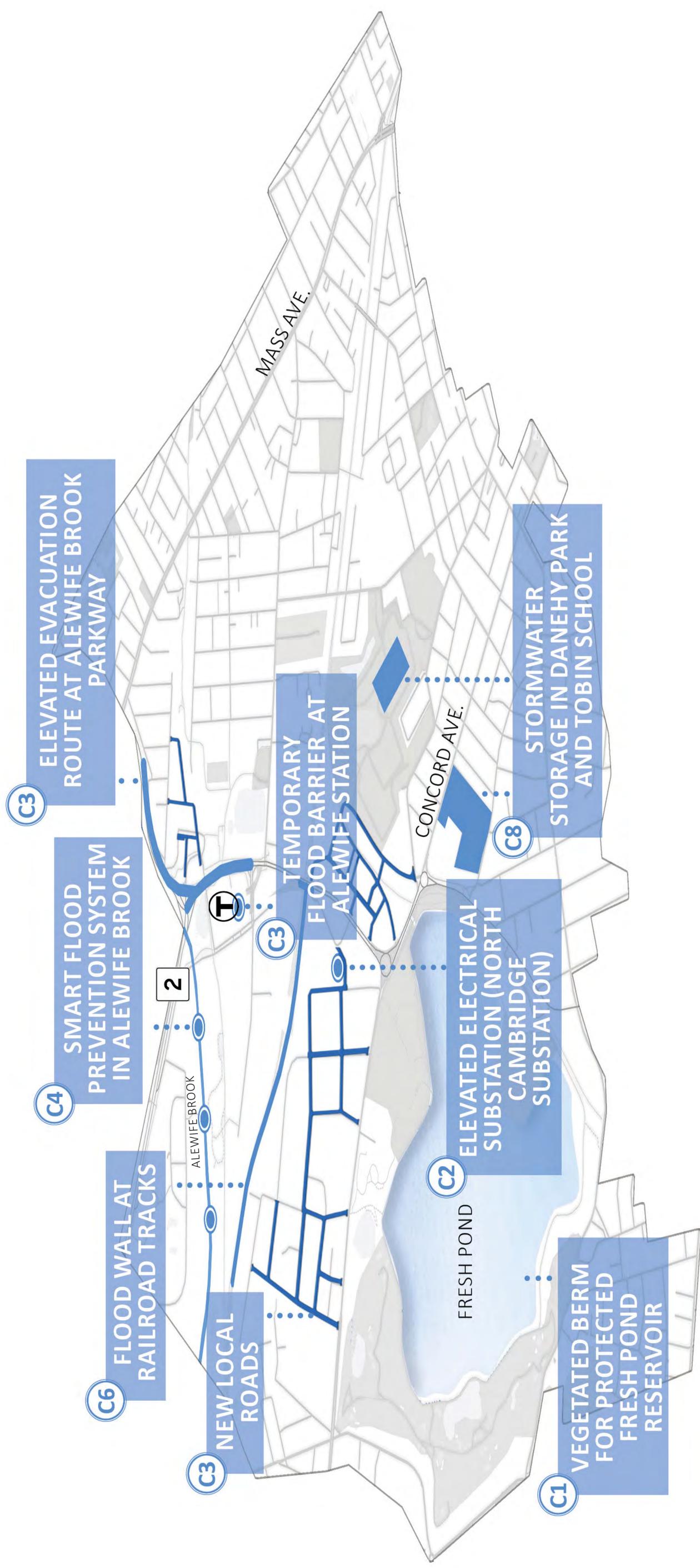
STRATEGY	TITLE	DESCRIPTION	YOUR VOTE
C1	<b>PROTECT FRESH POND RESERVOIR</b>	Protect Fresh Pond Reservoir, the terminal reservoir for the City's drinking water supply, from future flooding impacts.	
C2	<b>RESILIENCY OF ELECTRICAL DISTRIBUTION SYSTEM</b>	Engage with Eversource and the Massachusetts Public Utilities Commission to increase the resiliency of the electricity distribution system, particularly the Alewife substation.	
C3	<b>RESILIENCY OF THE TRANSPORTATION SYSTEM</b>	Engage the MBTA and MassDOT to increase the resiliency of major transportation and transit infrastructure to ensure mobility and access to evacuation routes. Complete street grid by adding new local roads for better connectivity to the Alewife train station.	
C4	<b>REGIONAL FLOOD RESILIENCY AT AMELIA EARHART DAM AND OTHER SITES</b>	Collaborate regionally and with the State on structural and operational improvements at the Amelia Earhart Dam. Plan, design and implement storm surge barriers, "smart" flood prevention systems and conveyance improvements at appropriate sites.	
C5	<b>WATERSHED SCALE FLOOD STORAGE</b>	Collaborate regionally to plan and implement watershed-scale flood storage at appropriate sites in the Mystic River watershed.	
C6	<b>SUB-NEIGHBORHOOD SCALE FLOOD PROTECTION</b>	Create a neighborhood solution for sea level rise/storm surge flooding for the extended Quadrangle area and Fresh Pond.	
C7	<b>COMBINED SEWER SEPARATION</b>	Continue combined sewer separation in the Alewife area to reduce adverse public-health impacts during flood events and to protect water quality.	
C8	<b>STORMWATER STORAGE</b>	Evaluate the collective benefits of adopting updated stormwater storage requirements at the parcel scale to mitigate flooding at the sub-neighborhood scale.	
C9	<b>CLEAN-ENERGY FACILITY</b>	Establish a neighborhood-scale clean energy facility in the Alewife Quadrangle area.	



CLIMATE CHANGE PREPAREDNESS & RESILIENCE (CCPR) PLAN  
**RESILIENT INFRASTRUCTURE**



MAPPING THE POTENTIAL LOCATIONS OF RESILIENT INFRASTRUCTURE STRATEGIES



[SOURCE: CCPR, 2017]



**PROTECTING FRESH POND**

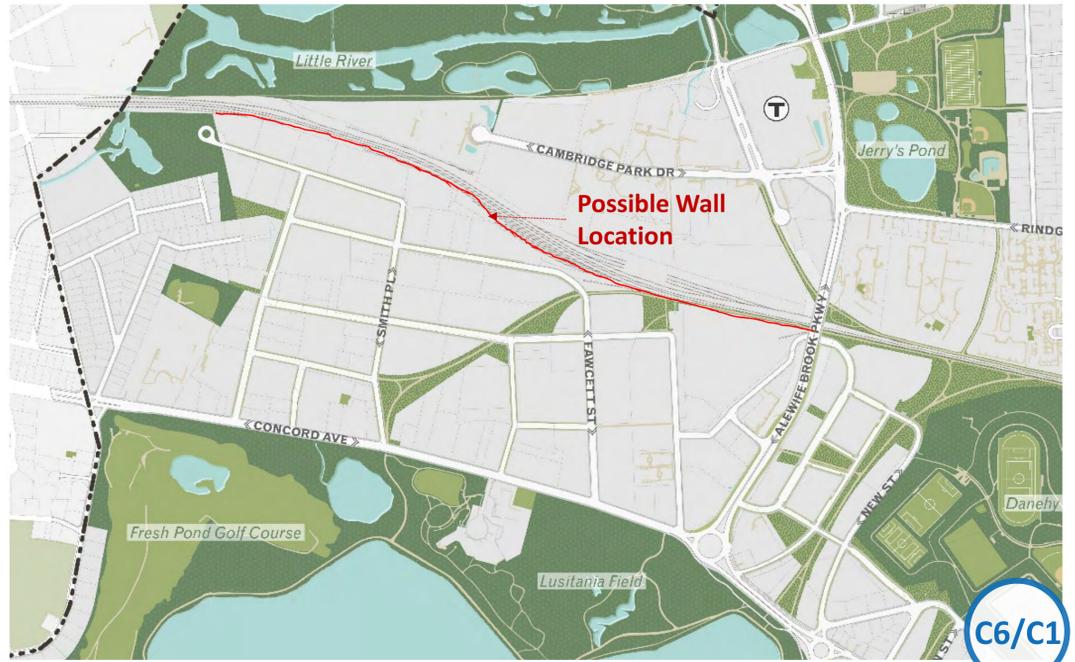


**C1**

[SOURCE: CCPR, 2017]

Evaluate building a vegetated berm at elevation 23.15 feet CCB\* along the Fresh Pond Golf Course. This strategy could effectively protect the Fresh Pond Reservoir for up to the 2070 100-year sea level rise / storm surge flooding.

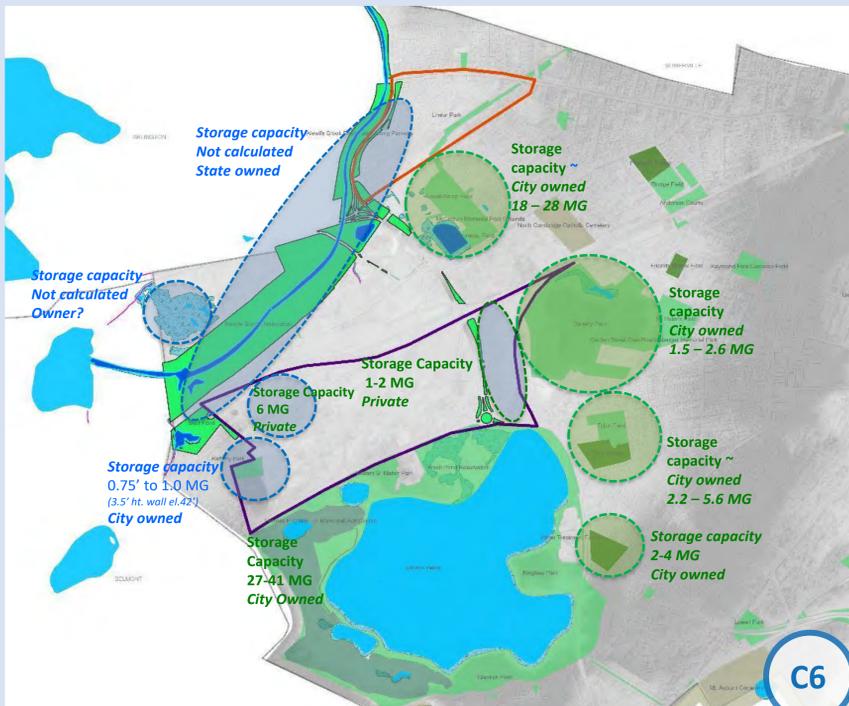
\*Cambridge city-base datum



**C6/C1**

[SOURCE: CCPR, 2017]

Evaluate building a flood wall at elevation 22.5 feet CCB South of the railroad track along the Alewife Quadrangle. Building a flood wall at this location can protect the Fresh Pond Reservoir, as well as the Alewife Quadrangle neighborhood.



**C6**

[SOURCE: CCPR, 2017]

**RESILIENT ALEWIFE TO PRECIPITATION FLOODING**

Flood volume for the 10-year 24-hour storm in the Alewife area is projected to increase from approximately 13 MG in the present to 33 MG by 2070. Implementation of the green infrastructure solutions at the Maximum Extent Practicable (MEP) scale in the Alewife area can reduce flooding by 37% to approximately 21 MG of flood volume

A four-foot berm surrounding the area behind Tobin School and an underground storage tank could hold 5.6 MG of flood volume.

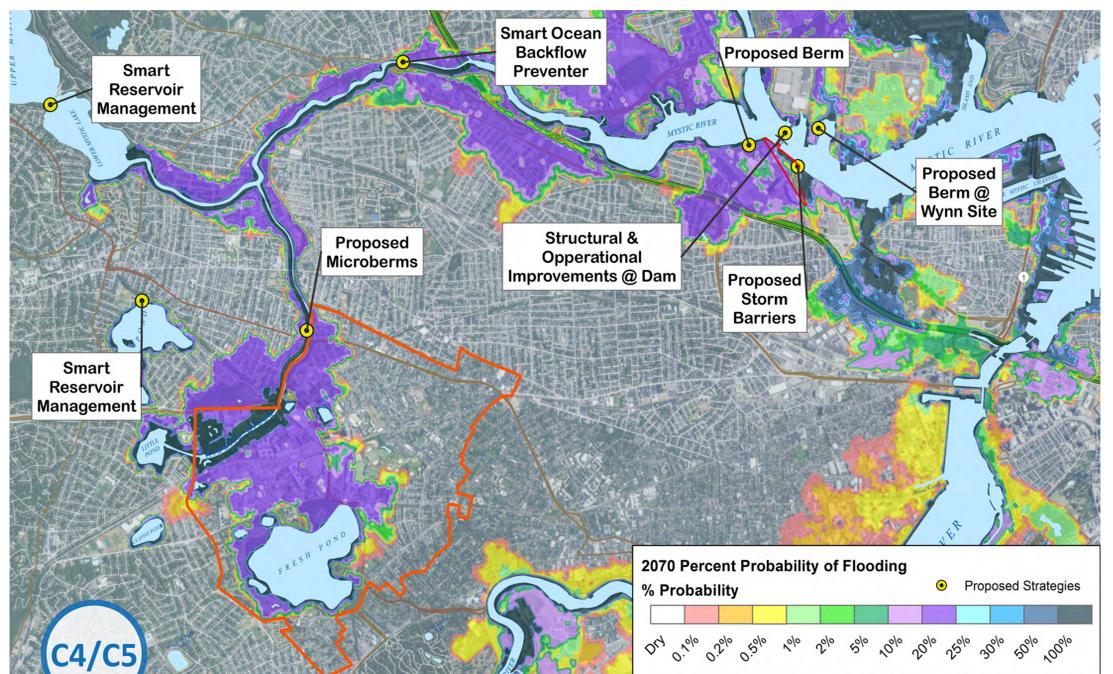
Three-foot berms installed in Danehy Park in the soccer field, baseball field, and running track could store 6.3 MG.

Fifty percent of new development in the Alewife Quadrangle area implementing revised stormwater storage requirements can reduce the flood volume for the 2030 10-year storm by 0.7 MG.

**FLOODING RESILIENCY AT REGIONAL OR WATERSHED SCALE**

Collaborate regionally and with the State on structural and operational improvements at the Amelia Earhart Dam. Plan, design and implement storm surge barriers, "smart" flood prevention systems and conveyance improvements at appropriate sites.

Evaluate if existing reservoirs within the watershed can be pre-drained based on severe weather forecasts by NOAA to maximize storage in the watershed.



**C4/C5**

[SOURCE: CCPR 2017]