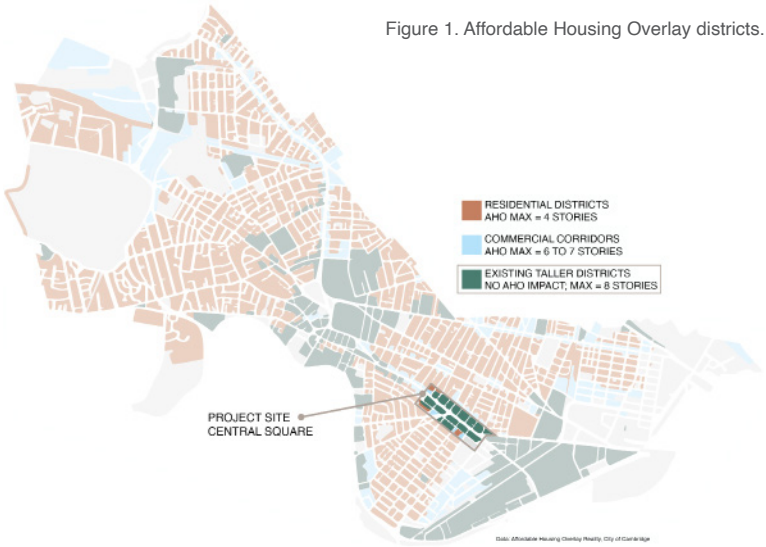
Rising Central

Addressing Climate Change + Housing Stability + Human Health in Cambridge, MA

Figure 1. Affordable Housing Overlay districts.



What does **equitable** community resilience look like in the face of rising sea levels, unprecendented flooding, and climate change?

How can Cambridge prioritize forward-looking climate resilience on the path to building stronger more **accessible**, and more sustainable housing infrastructure?

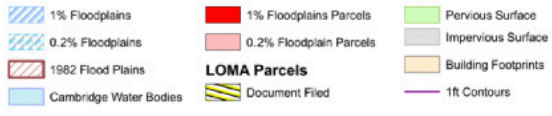
How can we, as responsible urban planners, address the intersecting crises of climate change, housing instability, and mental **health** for both the local communities and transient student populations that make up the social fabric of Cambridge?

The floodplane maps (right) of the City of Cambridge show the projected sea levels of 2070 and highlight the regions of the city most vulnerable to climate change. The maps also highlight the impervious surface cover that dominates Cambridge's urban fabric, an aggrevator of climate change vulnerability. While the maps higlight climate risks for a future Cambridge, the consquences are being felt by the community in the present day; the 2020 Cambridge Community Health Assessment identified the impacts of climate change as a top-three health concern for residents– contextualizing the urgent need for a policy response.

This environmental health vulnerability intersects with social health ("a lack of affordable housing") and behavioral health ("social isolation" and "mental health conditions") issues, demonstrating the interrelatedness of the climate, housing instability, and mental health crises. The housing market is quite unique in Cambridge; a large graduent student population that is underserved by University housing look to the private market, driving up rental prices for community members already struggling to afford housing. This, alongside expensive construction costs, cuts in federal funding, and competition from market-rate developers are hinderaces to creating affordable housing in the city.

Current public policies are working to address environmental sustainable, housing affordability, and mental health but are failing to provide a holistic aproach. The Green Roofs Ordinance siged by the City of Cambridge in May 2021 calls for all new construction exceeding 25,000 sq.ft to include green or bisolar roofing on the available roof area. However, through a special permit, this requirement may be exempted or reduced through a unit-price contribution to the Cambridge Affordable Housing Trust, creating zero-sum tradeoff between green infrastructure and affordable housing development.

The Affordable Housing Overlay (AHO) under Cambridge's Zoning Ordinance allows for city-wide, by-right construction of affordable units for groups under 80% and 100% Area Median Income (AMI). However, this excludes the student population– a major source of strain on local housing demand. The AHO also geographically excludes certain regions of Cambridge that are considered existing taller districts (see Figure 1).



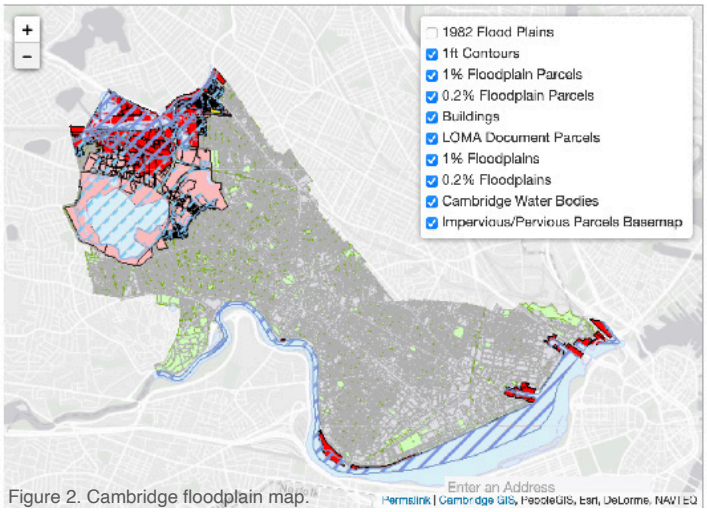


Figure 2. Cambridge floodplain map.

Project Overview

Our project introduces a holistic approach to addressing climate change, housing instability, and human health while thinking through a framework to improve zoning laws in Cambridge. We focus on Central Square– one of the most significant urban nodes in Cambridge. Not only is it one of the most attractive zones for students, considering its proximinity to prominent institutions such as Harvard University and Massachusetts Institute of Technology, but it is also a hub for commercial businesses and transportation networks, appealing working professional locals as well.

While Central Square is protected by immediate risks of flooding– making it a smart location for new development– 97.7% of the region falls under the impervious surface cover, with a palpable lack of green and open spaces. Stormwater drains to a series of outfalls where it then discharges into the Charles River, carrying pollutants from the land into the water. This means that if future development in the region continues as is, Central Square may become a primary exacerbant of climate change vulnerability rather than a crucial mitigant. Understanding these conditions helps guide the development of a Green Infrastructure intervention that will successfully restore natural hydrology on the project site, and when scaled, across the city.

Rising Central

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Store	Address	Current Dimensions (ft)	Current Height (ft)	Additional Height	Additional Floors	Units / Floor	Units / Building	Gross Floor Area
ABC Pizza House + Coolidge Cleaners + 7 Eleven	738-746 Mass Ave	100 x 100	12	68	6	17	102	50,800
Dr Dental	714 Mass Ave	50 x 50	22	58	5	4	21	10,900
AT&T + Luckys	692-694 Mass Ave	50 x 70	12	68	6	6	36	17,900
Chipotle + Supreme Liquors	581-600 Mass Ave	105 x 80	12	68	6	14	86	42,800
Target	564 Mass Ave	78 x 166	15	65	6	22	132	65,748
Goodwill + Monkfish	520-524 Mass Ave	70 x 70	12	68	6	8	50	24,900
Phoenix Landing	512 Mass Ave	26 x 70	12	68	6	3	19	9,420
Viale	502 Mass Ave	45 x 70	12	68	6	5	32	15,950
MChung + Convenience + Middle East	464-474 Mass Ave	93 x 193	12	68	6	31	183	91,149
McDonalds	463 Mass Ave	50 x 70	15	65	6	6	36	17,900
Tent City + Boomerangs + Revolutionary	541-565 Mass Ave	125 x 100	12	68	6	21	128	63,700
HMart + VIM	579-581 Mass Ave	60 x 55	22	58	5	6	28	14,500
Blick + TD	617-619 Mass Ave	95 x 190	22	58	5	31	153	79,250
Convenience Plus + Asmara + Seven Stars	731-743 Mass Ave	115 x 80	15	65	6	16	94	46,800
current building aspects					TOTAL PROJECT UNITS:		1099	
future building aspects (under proposal)								

Table 1. Proposed project sites

How would the proposal be carried out? Who are the stakeholders involved?

Fourteen building sites along Massachusetts Avenue in Central Square are currently underutilized, falling with an existing taller district under Cambridge Zoning and falling far below their maximum heigh allowance of 80 feet (see Table 1). Under the project, these buildings would be redeveloped into mixed-use commercial spaces and graduate student housing. An addition of three new public garden-parks would complete the collective climate resiliency plan for Central Square.

A multitiered stakeholder process would be employed to see the project through to completion and to ensure the Infrastructure's continued maintenance. Universities, which already recognize the dearth of housing options available to their graduate students, would develop, own, and operate the fourteen new graduate housing buildings. The three garden-parks would be developed and maintained by Cambridge's Parks Department. Ultimately, these institutions would collaborate through a mutually-beneficial public-private partnership. Capitalizing on a unique public financing, opporunity, Biden's Bipartisan Infrastructure Bill could provide predevelopment and development financing.

How does the project address climate health?

In order to rise above the flood risks faced by the greater Cambridge Community, using the Copenhagen Cloudburst Streets proposal as an inspiration for blue-green infrastructure, the proposal introduces a network of rooftop gardens and public garden-parks to Central Square. Using the mechanisms of filtration, sedimentation, evapotranspiration, and detention, these gardens would treat stormwater runoff, removing impurities through filtration, sedimentation and biological absorption.

This would reduce the flow speed of stormwater and encourage infiltration, whilst also beautifying the urban landscape, improvingimpervious surface cover, and– importantly for Central Square– mitigating the urban heat island effect. This Green Infrastructure also brings added benefits of reducing street flooding, creating visual interest, providing shade, cleaning the air, and creating habitat for flora and fauna.

How could a climate resiliency approach through housing help Cambridge?

The project identifies blue and green infrastructure as a means to achieve environmental resiliency goals, address health equity and housing access, and develop a stronger social collectivity. Through collaborative activities and collective management of the gardens, these green spaces would create regenerative infrastructure for increased social integration, improved mental health through preventative care brought about by integration in nature, increased housing stability, safe and clean drinking water, cleaner air, and ameliorated health impacts of climate change for the student community and greater community of the City of Cambridge alike.

What happens next - Cambridge-wide proposal?

Understanding the need for greater city-wide intervention as a means to address climate change, the proposal therefore calls for climate resiliency to be used as a framework for– rather than an alternative to– critical housing development. The Green Roof Ordinance positions these two in conflict, but a revised, intersectional zoning approach would elimiate the exemption for 100 percent affordable housing developments and instead provide public supports to ensure that affordable housing meets resilience goals too. The proposal also aims to bridge the gaps between the Affordable Housing Overlay and the housing market in Cambridge by bringing University housing under its umbrella.

This introduction of a collective urban planning approach that is holistic in nature addresses environmetal health, behavioral health, and social health through the framework of climate resilience. By bringing climate resilience to the forefront of planning and design, developers are encourage to produce resilient projects that also facilitate strengthening of the Cambridge community.