Cambridge Today

An interim report from the Envision Cambridge planning process



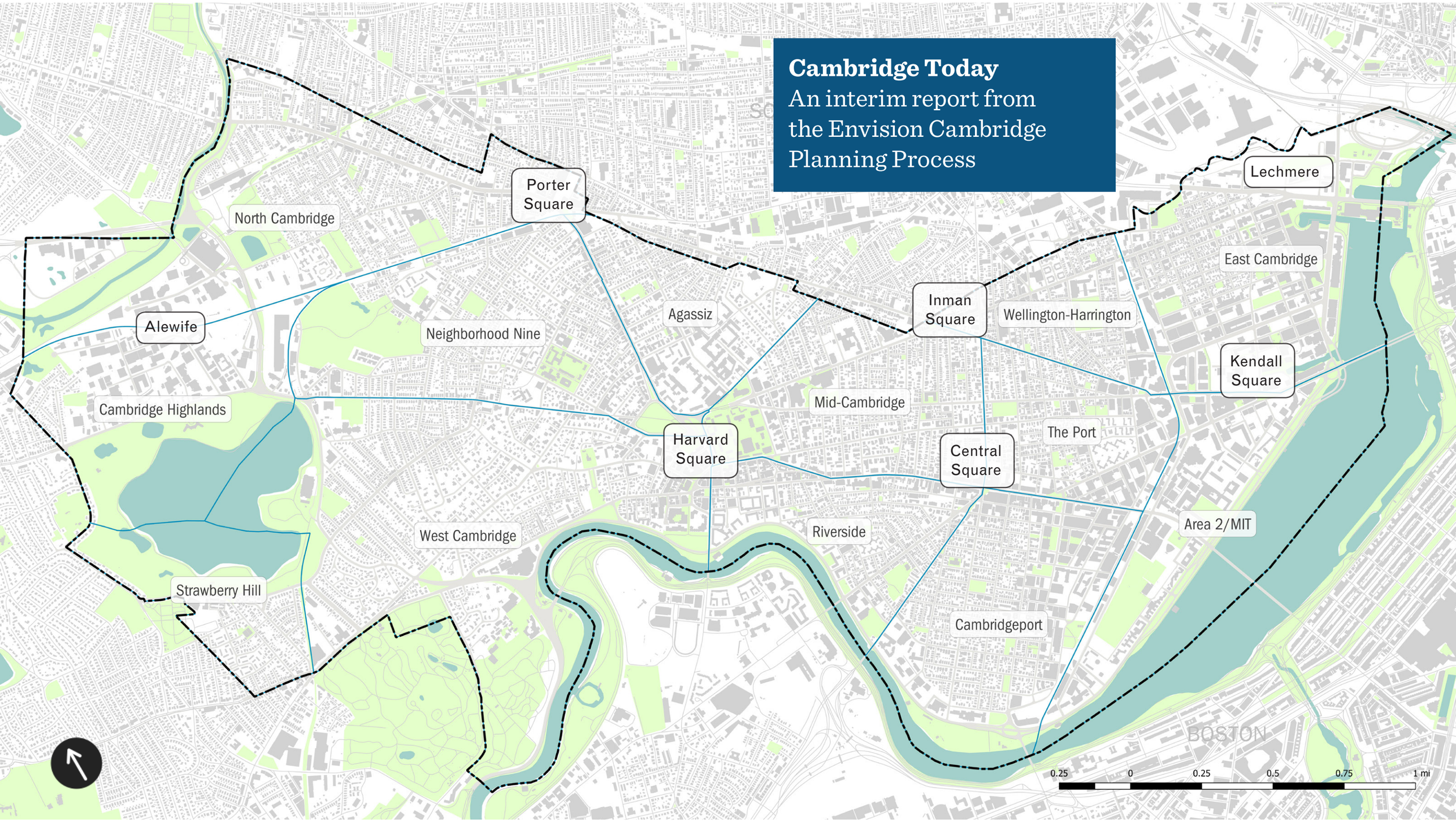
City of Cambridge

ENVISION CAMBRIDGE

Cambridge Today

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Cambridge Today
Prepared for the City of Cambridge Community Development Department, 2017. See Acknowledgements on page 134 for a complete list of those who contributed to or otherwise helped craft this document.

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What is Envision Cambridge?



Cambridge Today

Envision Cambridge

Envision Cambridge is a community-wide process to develop a comprehensive plan for a more livable, sustainable, and equitable Cambridge. It provides a framework for managing growth and change across six key focus areas—housing, economy, climate and the environment, mobility, urban form, and community interaction. With input from the community, Envision Cambridge created a shared vision for the future and articulated the city's core values that will guide future change. Moving forward, this process will develop goals, targets, and strategies for each focus area to help realize this shared vision.

Cambridge is a dense and dynamic city that is constantly evolving. Longtime residents and stable institutions coexist with university students, recent immigrants, and new residents and businesses. Since the end of the Great Recession in 2009, the pace of Cambridge's change and development has accelerated. Locally, a strong real estate market and Cambridge's top-tier universities have been important drivers of this change. Nationally, a renewed desire for living in urban centers has further accelerated Cambridge's growth. The challenge for Cambridge lies in how to manage this urban change in order to preserve and enhance its great neighborhoods, ensure economic opportunity and good jobs, and encourage social cohesion through community engagement in civic life.

Envision Cambridge is evaluating how these transformations impact and are impacted by the characteristics of the city's various neighborhoods, squares, districts, and corridors. The plan will explore the desired land uses, scale, and urban character in areas of the city most likely to change. Envision Cambridge will develop strategies to improve the city's neighborhoods and the lives of community members, guided by Cambridge's core values and shared vision. Additionally, this process integrates, evaluates, and advances the City's existing policies and programs through a comprehensive approach grounded in data analysis and community engagement.

The final plan will result in recommendations on a broad range of topics such as housing, mobility, economy, community interaction, urban form, and climate and the environment.

With input from the community, Envision Cambridge developed a shared vision around six core values for the city's future. The share community vision is:

"Cambridge is a forward-thinking, welcoming, and diverse city. We enjoy a high quality of life and thrive in a sustainable, inclusive, and connected community."

Read more about our Vision and Core Values on page 14.



What plans guided growth and change in Cambridge before Envision Cambridge?

Envision Cambridge will build on the most recent history of citywide planning in Cambridge, which dates from the 1990s. Cambridge developed its citywide growth policy, "Toward a Sustainable Future," in 1992–93. The City implemented this vision through citywide rezoning in 2001, and refined it through area-specific plans in key districts, such as the Eastern Cambridge Planning Study (ECaPS), Concord-Alewife Plan, and Kendall Square Central Square Planning Study (K2C2). The City also developed topic-specific plans to address key citywide issues, including the Bicycle Plan, the Open Space and Recreation Plan, the Net Zero Action Plan, and the Climate Change Vulnerability Assessment. These plans inform Envision Cambridge. *See "Citywide Planning in Cambridge" on page 20 for more information.*

What is this report?

This document provides an overview of how Cambridge has changed and where the city stands today. The report looks at the city's urban form, demographics, housing, economy, mobility, and environment in relation to national and local trends. It also articulates priorities and concerns derived from engagement with the community. This report intends to initiate dialogue about the challenges and opportunities facing the city and to set a stage for a public discussion of strategies to achieve the shared community vision.

Voices from Cambridge

A successful plan reflects the aspirations of all residents, workers, students, and visitors.

Community engagement is essential to creating a meaningful, long-term plan that has strong public support and is an accurate representation of what the Cambridge community wants to become over the next thirty years.[1] Envision Cambridge believes strongly that a successful plan reflects the aspirations of all our community, and is taking extensive measures to engage groups that are typically excluded from the planning process.

The following goals guide the outreach process:

1. Collect deep local knowledge to serve as a key source of information
2. Gather feedback on important questions for the future
3. Build an understanding among members of the public about the process and about the variety of perspectives held by those who care deeply about Cambridge
4. Create an engaged community through an inclusive and wide-reaching public engagement program
5. Develop a shared vision representative of all community stakeholders and set priorities for the city's future
6. Create a framework for ongoing outreach, collaboration, and engagement.

To meet these objectives, the engagement approach consists of in-person and online surveys (including non-English surveys), street team events, public workshops, panel discussions, advisory committees and working groups, and focus groups targeting hard-to-reach residents, including immigrant communities.[2]

The mobile engagement station, a large interactive model of Cambridge, gives the community the opportunity to highlight their favorite places in the city and to identify areas that are in need of improvement. The mobile engagement station is intended to be fun and interactive. The station also eliminates barriers to participation by enabling the Envision Cambridge team to go where people are, rather than expecting the public to come to traditional meetings or City events. After a year traveling with the mobile engagement station, the Street Team began introducing new mobile activities: Envision Cambridge Corridors and Envision Cambridge Streets. These activities help the public think about the tradeoffs inherent in any planning process.

In addition to the broad public engagement on the streets and at local events, the planning process includes input from the public through committees and working groups composed of 115 Cambridge residents, property owners, and representatives from businesses and institutions. There is an advisory committee guiding the overall plan, a working group advising the Alewife district plan, a working group focused on public engagement and communication, and four focus area working groups tasked with developing recommendations on housing, economy, mobility, and climate and environment. Each working group generates ideas for the plan that are informed by planning analysis and insights from public engagement.

1 To prepare for a citywide plan, the City conducted an initial outreach process in 2014–2015 to understand community concerns and aspirations. This process, known as Cambridge Conversations, responded to City Council interest in soliciting input from the community. The Cambridge Conversations process also intended to inform recommendations and a strategy to advance short- and long-range planning and urban design work, based on previous studies and recommendations. In broad-ranging, open-ended discussions, residents shared concerns, thoughts, and ideas about a citywide plan and process, which have informed the Envision Cambridge.

2 Non-English surveys included those in Amharic, Arabic, Bangla, Chinese, Haitian Creole, and Spanish. Hard-to-reach residents include American-born black and immigrant communities. Planning processes historically have not adequately engaged these groups.



Engagement by Numbers

As of September 18, 2017

3,566
Participants reached with the mobile engagement station and other mobile activities

1,706
Online and in-person survey responses

2,700+
Social media interactions

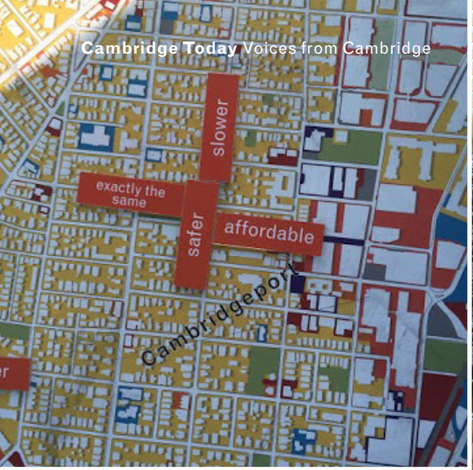
284
Public workshop attendees

115
Committee members on 7 committees and working groups

67.5
Hours of committee and working group meetings

160
Participants in focus groups with hard-to-reach populations

58
Public meetings, including workshops, panels, and working group discussions





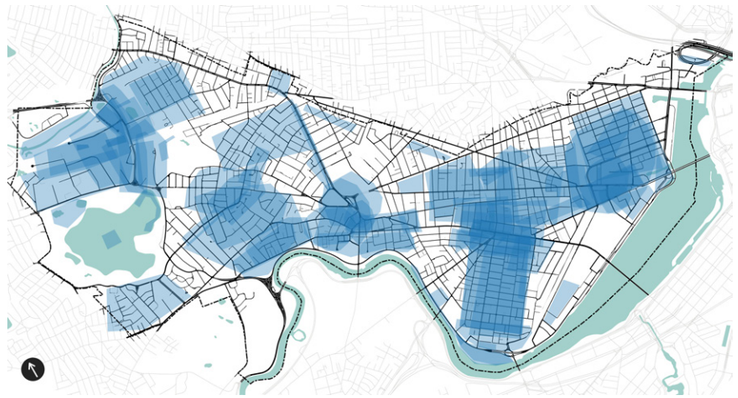












Envision Cambridge Engagement Feedback: the public's desire for change

The Envision Cambridge Street Team collected public feedback using the Mobile Engagement Station. During the Listening phase, members of the public marked the areas in blue where they desire future change (left). To learn more about this feedback, visit envision.cambridgema.gov/engagement-data

Listening and Visioning

The first year of Envision Cambridge consisted of two phases: Listening and Visioning. During the Listening phase, Cambridge's residents, workers, students, and visitors shared what they value about Cambridge and how the city can improve. Nearly 3,000 participants shared their concerns, hopes, and aspirations at a variety of locations across the city. This engagement led to a draft vision and core value statements, which were distributed for public comment. During the subsequent Visioning phase, community members took part in brainstorming exercises about these statements and identified words and phrases that resonated with their experiences in Cambridge. Through this iterative process, the Envision Cambridge team and the community refined the vision and core values, forming the foundation of the plan.

Key Findings

Following the first year of community engagement, a number of important conclusions were drawn about our values.

- → Overall, Cambridge boasts a strong sense of community and pride in place.
- → We value how safe the city is and the quality of its schools and public services.
- → We want to see more affordable housing, more job opportunities, and more variety in housing and businesses.
- → We want green spaces and natural resources to be protected, a built environment that encourages active lifestyles, nutritious food that is affordable and accessible, quality healthcare, and sustainable modes of transportation that are safe, efficient, convenient, and reliable for everyone.
- → Additionally, we value economic and cultural diversity. Cambridge should be a welcoming place to people of different races, cultures, and viewpoints.
- → We value education and lifelong learning in academics, the arts, and culture.
- → We want all community members to have access to education and training during all periods of their lives.

Vision and Core Values

How were the core values and shared vision developed? And how will they influence the plan?

Following extensive community outreach, Envision Cambridge identified six core values expressed by the public. Core values are the guiding principles that shape the plan's goals and recommendations. Envision Cambridge also worked with the community through workshops, surveys, and more to craft a single vision statement for the city. Understanding and drawing on the vision and core values will ensure that the Envision Cambridge plan responds to the needs of the community. Together, they will guide the city's future development.

What is the shared vision for Cambridge's future?

"Cambridge is a forward-thinking, welcoming, and diverse city. We enjoy a high quality of life and thrive in a sustainable, inclusive, and connected community."

What are Cambridge's core values?

Livability
We value a vibrant built and natural environment and support sustainable transportation with affordable and convenient access to daily needs and recreational resources.

Diversity and Equity
We are a welcoming community that celebrates our diversity and ensures access to affordable housing choices and opportunities to succeed.

Economic Opportunity
We provide opportunity and stability through access to quality jobs, workforce development and training, and livable wages that support economic security for residents.

Sustainability and Resilience
We take responsible action to reduce our impact on the environment and build a resilient city and strong community.

Community Health and Wellbeing
We promote healthy and active lifestyles in a supportive, safe community with diverse opportunities to connect with our neighbors and nature and to engage in civic life.

Learning
We embrace lifelong learning and celebrate art and creativity in our culturally rich community.

Urban Form

As a compact, walkable city of 6.43 square miles, Cambridge has a distinct and mature physical form. Its pattern of dense development, formed over four centuries, supports walking and biking, the viability of retail and other amenities, the health of the population, the likelihood of new urban development, and more. The mix of land uses, density, the design of streets and squares, and the pattern of open spaces all contribute to the high quality of life in the city. These elements are shaped by the interests of business and the market, the goals of large institutions, and the community's will embodied in collective action and government regulation. Moving forward, Cambridge must ask how the physical form of the city can evolve to support a growing population, changes in mobility and the environment, and shifts in how people live and work. The city must adapt while maintaining the traits that make Cambridge a great place to live, work, study, and play.

Learn more about . . .

"Historical Development" on page 18

"Citywide Planning in Cambridge" on page 20

"Urban Form and Population Density" on page 22

"Mix of Land Uses" on page 24

"Institutional Uses" on page 25

"Building Density" on page 26

"Public Realm, Streets, and Open Space" on page 29

"Policy Context: Citywide Planning" on page 21



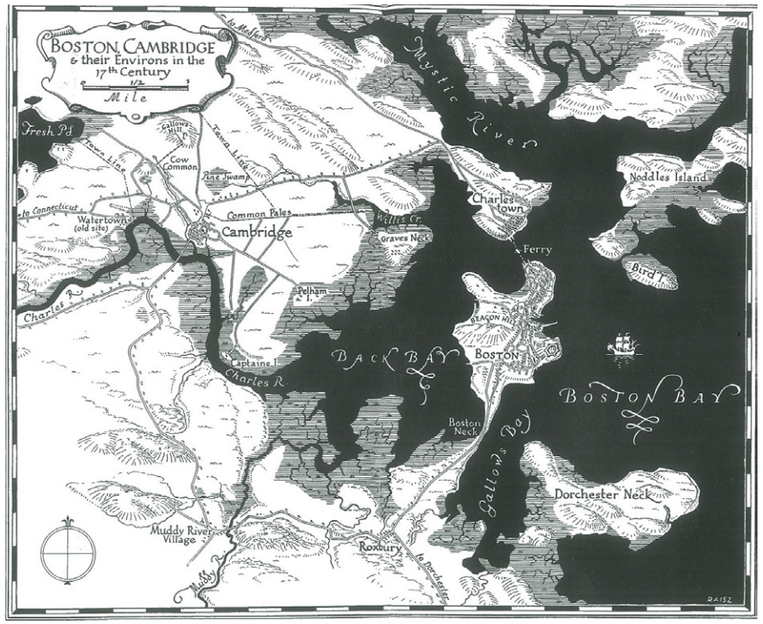
City of Cambridge

Cambridge Today Urban Form



Cambridge began as town centered near today's Harvard Square. Some of today's main streets were already present as roads to other towns.

Source: Edwin Raisz, 1935, in Maycock and Sullivan, *Building Old Cambridge,* 2017.



Historical Development

Many of the defining aspects of Cambridge's urban form, such as its human-scale streets and its stable residential neighborhoods, can be traced to the city's historical development patterns. Settled in 1630 as the village of Newtowne and renamed Cambridge in 1638, the settlement was centered near today's Harvard Square, up the Charles River from the Boston Harbor. Cambridge was the first town in New England to be laid out in a grid plan, with the streets that formed the core of the original village meeting in right angles. (This early grid exists to this day in John F. Kennedy and Dunster streets running north-south, and Mount Auburn, Winthrop, and South streets running east-west.) Today, however, many people's "mental map" of the city is defined by the major streets and their cross-roads, the "squares." Major streets like Massachusetts Avenue began as paths that connected Cambridge to other nearby settlements, and would become key corridors central to Cambridge life over the ensuing centuries.

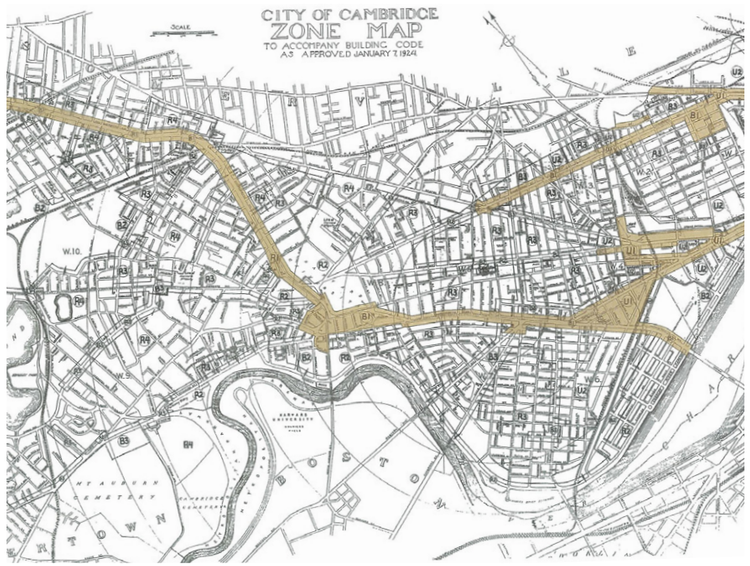
By the early nineteenth century, a series of nodes had grown up along these paths and new roads, with expanding settlements at present-day Central Square and Lechmere. Cambridge developed as four separate rival villages—East Cambridge, Cambridgeport, North Cambridge, and Old Cambridge (the original settlement around Harvard Square)—until it was incorporated as a single city in 1846.

Through the nineteenth and early twentieth century, these nodes became increasingly interconnected as large properties were subdivided, the street network expanded, and new buildings—including the near-ubiquitous triple-decker—were introduced to house a growing population. Marshes along the Charles River, north of Fresh Pond, and west of Lechmere were filled in with new land, new streets, and new buildings, expanding the borders of the city.

In the twentieth century, new urban planning tools such as zoning and urban renewal changed the cityscape. New development was pushed to the existing commercial corridors, as well as to formerly industrial land cleared through federal urban renewal policy. Parkways and other large roads were built along Cambridge's edges, circumscribing the city. The public realm became increasingly devoted to the automobile, and new architectural and urban planning theories altered the way buildings related to their context, thus challenging the vibrancy of city streets. In recent decades, City leaders have sought to reassert the historic relationship between building, street, and public space that pervaded urban development before those twentieth century changes, while acknowledging that the real estate market will not always create vibrant urban spaces on its own.

Cambridge's contemporary urban form is the result of these historical patterns and forces. Any plan for the future must adapt the city's urban form to changing social and economic conditions, while retaining the essential fabric which animates everyday life in the city.





Top: By 1830, new settlements had grown at Cambridgeport and East Cambridge. Both would quickly expand to their natural borders at the marshes, which would soon be filled to make new land.

Source: John G. Hales, with additions by the Cambridge Historical Commission, in Maycock and Sullivan, *Building Old Cambridge,* 2017.

Bottom: Cambridge introduced zoning in 1924. Development in the shaded area was permitted to reach a height of 100 feet.

Source: City of Cambridge, 1924, with additions by the Cambridge Historical Commission, in Maycock and Sullivan, *Building Old Cambridge,* 2017.



Citywide Planning in Cambridge

Over the years, the City of Cambridge Community Development Department has prepared a series of area plans to respond to the issues and trends of its time, and today's city was shaped in part by these efforts.

In the 1970s, as Cambridge's population declined, redevelopment was seen as a priority, leading to a series of plans for the revitalization of specific areas such as the East Cambridge Riverfront (1978), the Alewife Revitalization Plan (1979), and the Cambridgeport Revitalization Plan (1983). As these plans began to shape the city in the 1980s, and Cambridge and the region regained population, it became important to coordinate the area-specific plans. This provided the impetus for the first citywide growth policy, "Toward a Sustainable Future" (1993), followed by a citywide rezoning in 2001.

Following the redevelopment efforts of the 1970s and 1980s and the citywide growth policy of 1993, the City undertook a series of neighborhood and topical plans. These plans set policies and goals for inclusionary housing, open space, traffic calming, bicycling, climate protection, economic development, and energy, among other topics. Area plans revisited some of the areas studied for redevelopment through the East Cambridge Planning Study (ECaPS, 2001) and the Concord-Alewife Planning Study (2006). More recently, the Kendall Square and Central Square Study (K2C2, 2013) looked at an important swath of Cambridge that connects two commercial districts. The plan developed recommendations that are in the process of being implemented.

Cambridge has added 25 million square feet of new development and 100+ acres of new parks since 1970.

Since the 1970s, the city has grown by more than 25 million square feet of new development; more than 100 acres of new parks, plazas, and playgrounds; and more than 15,000 new residents. Cambridge has been one of the anchors in a regional economic and population boom. *(See "Population growth and change in household structure" on page 39 and "Job Growth" on page 85 for more information.)* In East Cambridge alone, decades of planning and development brought more than 3 million square feet of new development and 9 acres of new parks to the neighborhood. In Cambridgeport, more than 2 million square feet of new development and approximately 4 acres of new parks have helped redefine the neighborhood.[1] Envision Cambridge complements and builds on these efforts.

1 Community Development Department, http://www.cambridgema.gov/CDD/planud/urbandesignprimer.

Policy Context: Citywide Planning

In 1992, the City began analyzing the previous decades of development to create a comprehensive framework for managing future growth, resulting in "Towards a Sustainable Future" (1993). In combination with the zoning and area plans, this 1993 growth policy has served as the city's comprehensive plan. The growth policy document provides a framework for evaluating specific actions, such as urban design, land use, or zoning decisions, or the creation of new open space areas on public or private land. At a finer grain, the growth policy helps when evaluating zoning changes in neighborhoods and in considering permitting conditions, such as those for special permits or variances.

In 2007, the city published an update of the original document incorporating the City Council's Citywide and Eastern Cambridge zoning revisions (2001) and the Concord-Alewife zoning changes (2006). Specifically, the 2007 update highlights the many changes in public policy that influenced development over the last decade, including the 2001 citywide rezoning; the end of rent control in 1994; the ramping up of the city's affordable housing development efforts through Inclusionary Zoning; the adoption of the Community Preservation Act; the adoption of the Parking and Transportation Demand Management (PTDM) Ordinance; the rise of biotechnology and life sciences as a mainstay of the local economy; the continued push to expand and improve open spaces; and the city's ambitious efforts to address the effects of climate change.

Select Citywide and Area Plans, 2001–present

- → Citywide Growth Management process and Citywide Rezoning, adopted 1998 through 2001
- → Green Ribbon Report, 2000
- → Eastern Cambridge Planning Study and Eastern Cambridge Rezoning, adopted October 2001
- → Harvard Square Development Guidelines, 2002
- → Agassiz Neighborhood Study, 2003 and 2008 Update
- → Concord-Alewife Planning Study and Rezoning, adopted June 2006
- → East Cambridge Neighborhood Study Update, 2006
- → Strawberry Hill Neighborhood Study Update, 2007
- → West Cambridge Neighborhood Study, 2007
- → Wellington-Harrington Neighborhood Study Updates, 2005 and 2009
- → Healthy Parks & Playgrounds Initiative, 2009
- → Area Four Neighborhood Study Updates, 2004 and 2010
- → Cambridgeport Neighborhood Study Updates, 2004 and 2010
- → Neighborhood Nine Neighborhood Study Updates, 2004 and 2010
- → Aging in the Cambridge Community: A Study of the Human Services and Physical Environment of Cambridge Relative to the Needs of the Senior Population, 2010
- → Cambridge Riverfront Plan, 2010
- → Mid-Cambridge Neighborhood Study Updates, 2005 and 2011
- → Riverside Neighborhood Study, 2003 and 2012 Update
- → North Massachusetts Avenue Study, 2012
- → Kendall Square/Central Square (K2C2) Study, 2013

Urban Form and Population Density

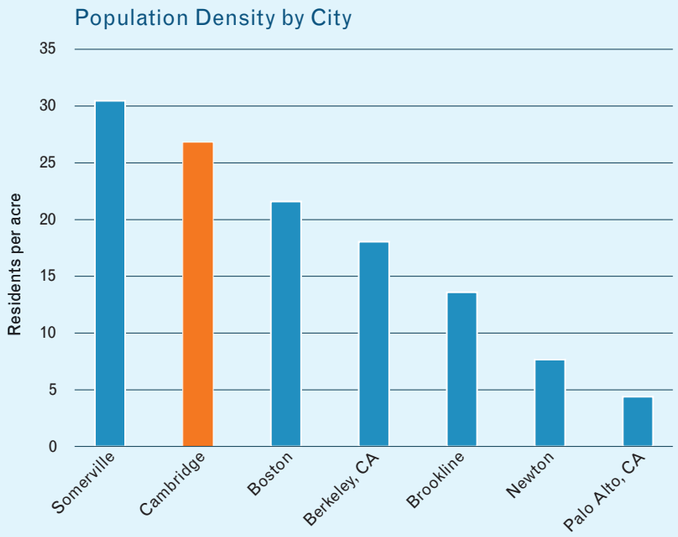
Much of Cambridge's vitality is due to its relative density, centered along corridors and squares, and its walkability and transit connectivity. Cambridge is, on average, a densely populated city, particularly when compared to communities with similar social and economic characteristics, such as Berkeley and Palo Alto, California.[2] Cambridge is home to more than 27 residents per acre.[3] The city swells to roughly 42 people per acre in the daytime with the arrival of people who work or study in Cambridge.[4] Cambridge's residential population is not equally dense across all neighborhoods, however. Riverside is the densest area, holding more than 63 residents per acre.[5] By contrast, Cambridge Highlands, which includes the Alewife Quadrangle, is home to about 4 residents per acre.[6]

Urban form contributes to this residential and daytime density in two ways. First, Cambridge's traditional multifamily apartment buildings (including triple-deckers) allow for denser residential living than newer housing stock prevalent in more recently founded cities in the American Southwest or nearby suburban communities such as Lexington. Second, Cambridge's squares (and the mixed-use corridors that connect them) create concentrated commercial activity in walking distance from dense residential neighborhoods and transportation nodes. *(See "Mobility" on page 92 for more information on how people move around the city.)*

Cambridge's "daytime" population, which includes workers, is 27,000 people per square mile.

It is not only the colocation of these uses that enables the city's vitality, but the way these uses come together in the public realm—the way the city's buildings meet its streets and the design of those spaces. Since the late 1980s, the City has taken an active role in promoting urban design that encourages an experience of density that is vibrant and enjoyable. *(See "Policy Context: Citywide Planning" on page 21 for more on these initiatives.)*

Cambridge has a high residential population density compared to similar cities.



Source: Census Bureau Population Estimates, 2015

2 Density describes both the distribution of people living, working, and visiting a city, as well as the lived experience of the buildings and the public realm.
3 American Community Survey, 2010-2014 5-year estimates
4 Ibid.
5 City of Cambridge Neighborhood Statistical Profiles, 2016 (US Census 2010 data)
6 Ibid.

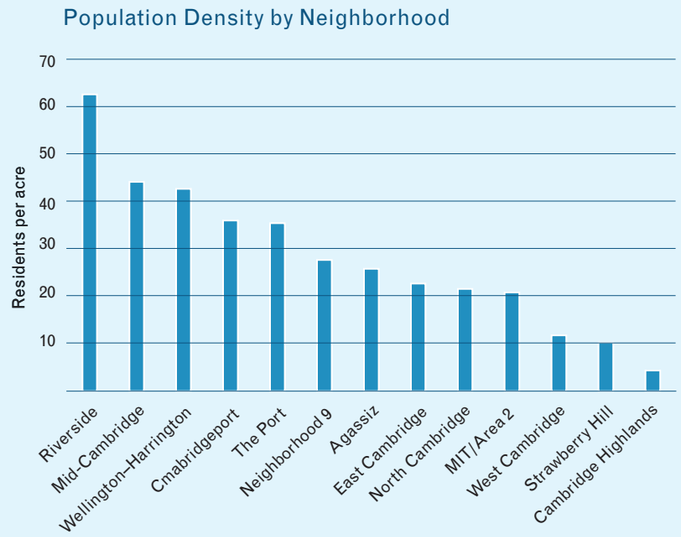


Squares and commercial corridors (like Massachusetts Avenue at Inman Street, left) are key to supporting dense neighborhoods by providing needed community amenities like restaurants and gathering space. Conversely, diverse business districts can only thrive within dense communities.

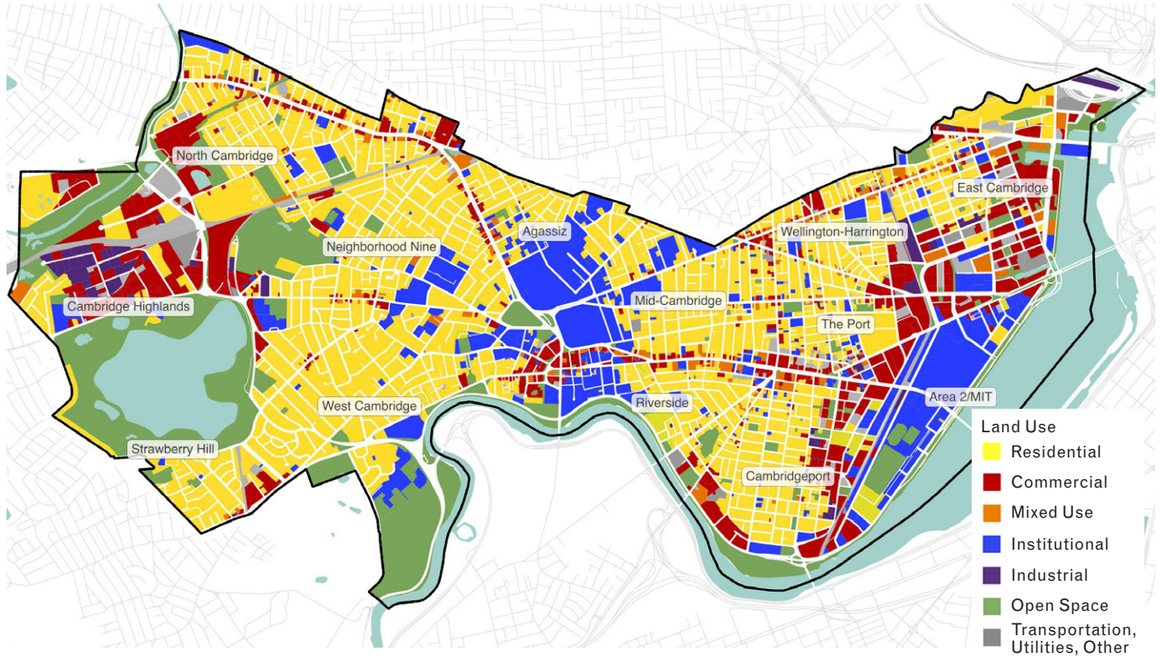
"We should have lively streets, local businesses, and plenty of places to play."

— Wellington-Harrington resident via online survey

Riverside is the most residentially dense neighborhood in Cambridge.



Source: City of Cambridge Neighborhood Statistical Abstracts, 2016 (US Census, 2010 data)



Citywide Land Use

Source: City of Cambridge Community Development Department

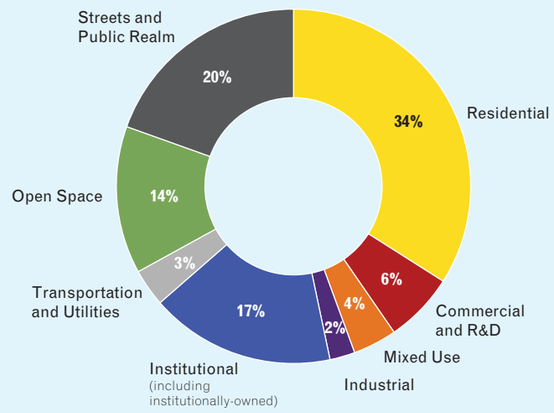
Mix of Land Uses

Cambridge is not dominated by any single land use, but rather has a diverse, intricate pattern of varied uses. Of Cambridge's land, 34% is devoted to purely residential use, while 17% of land is institutional (when including all land owned by Harvard, MIT, and Lesley universities).[7] Cambridge's open spaces occupy 14% of the city's land, with another 20% representing streets, sidewalks, plazas, and the other spaces between parcels.[8] The city's traditional residential neighborhoods are knit together by historic commercial corridors and flanked by large-scale institutional and commercial districts. The corridors are a blend of retail, food service, commercial, residential, and a small amount of institutional uses.

The arrangement of housing around commercial, institutional, and mixed uses creates quiet and inviting residential neighborhoods with easy access to daily needs by walking, transit, or bicycle. Of the city's retail and food establishments, 71% are found in clusters, mostly along main street corridors, or at the squares where major streets meet.[9] Of all the city's buildings, 54% are within a quarter-mile (about five minutes walk) from these clusters, and more than 85% of buildings are within a half-mile (about 10 minutes walk) of those clusters.[10] Much of Cambridge's office space is similarly located at or around the city's squares, but is also found in commercial districts on formerly industrial land like Kendall Square. Cambridge's relative density invites clustering of complementary uses that can benefit from being close together, such as business in the knowledge economy. *(Read more about density in "Building Density" on page 26 and the knowledge economy in "Cambridge's Key Industry Groups" on page 86.)*

7 City of Cambridge Community Development and Assessing departments; Envision Cambridge analysis
8 Ibid. Open space calculations do not include open spaces owned by higher education institutions or school playgrounds.
9 Ibid.
10 Ibid.

Land Use as Percent of Citywide Land Area



Cambridge's urban form and density enables 85% of the buildings to be within a 10-minute walk to a retail and food service cluster.

The urban form is characteristically defined by mixed-use commercial corridors running through residential neighborhoods which are flanked by expansive institutional and commercial districts.

Source: City of Cambridge Community Development and Assessing departments. Water bodies such as Fresh Pond that sit within Cambridge's borders were not considered part of the citywide land area in this analysis.

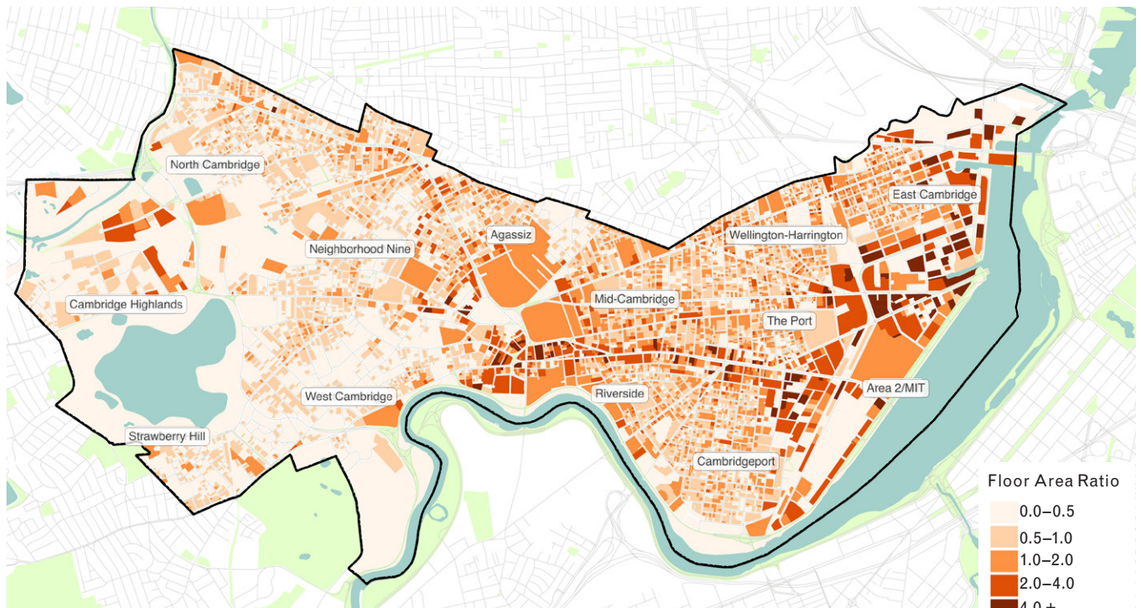
Institutional Uses

Cambridge's institutions of higher education make up large portions of the city's urban fabric. Harvard University, Massachusetts Institute of Technology (MIT), and Lesley University own large quantities of land in key locations. In many cases, institutional uses create a radical break from the rest of Cambridge's urban form. Harvard Yard, for instance, is a collection of buildings with no relationship to any street in the traditional sense, and the Yard is walled off from the rest of the city. Spaces of higher education are critical in the functioning of Cambridge's economy and add to the variety of the city's built character, but are significant barriers in the city's urban form.

Cambridge's institutions own or use 17% of the city's land.

The institutional presence in Cambridge is not limited to the iconic campuses. Higher education uses, when combined with other institutional uses and property owned by institutions of higher education, account for 17% of Cambridge's land.[11] Much of this land, such as the formerly industrial area near MIT, is used for commercial purposes and is not overtly part of any institution. More than 81 acres of the property owned by Harvard and MIT is not occupied by those institutions.[12] In fact, commercial, research & development (R&D), and industrial uses account for 78% of the built area owned but not occupied by Harvard and MIT, while residential uses account for 21% of that built area.

11 City of Cambridge Community Development and Assessing departments, Envision Cambridge analysis
12 Ibid.



Parcels by Floor Area Ratio

Source: City of Cambridge Community Development Department; Envision Cambridge analysis. A floor area ratio (FAR) of 1 represents a parcel that contains an equal amount of land area as it does gross area of building space. An FAR of 2 means that parcel has twice as much building space as it does land area. Importantly, FAR says nothing about the arrangement of buildings on the parcel. For instance, a parcel with an FAR of 2 could contain a 2-story building filling the entire lot, or a 4-story building on half the lot.

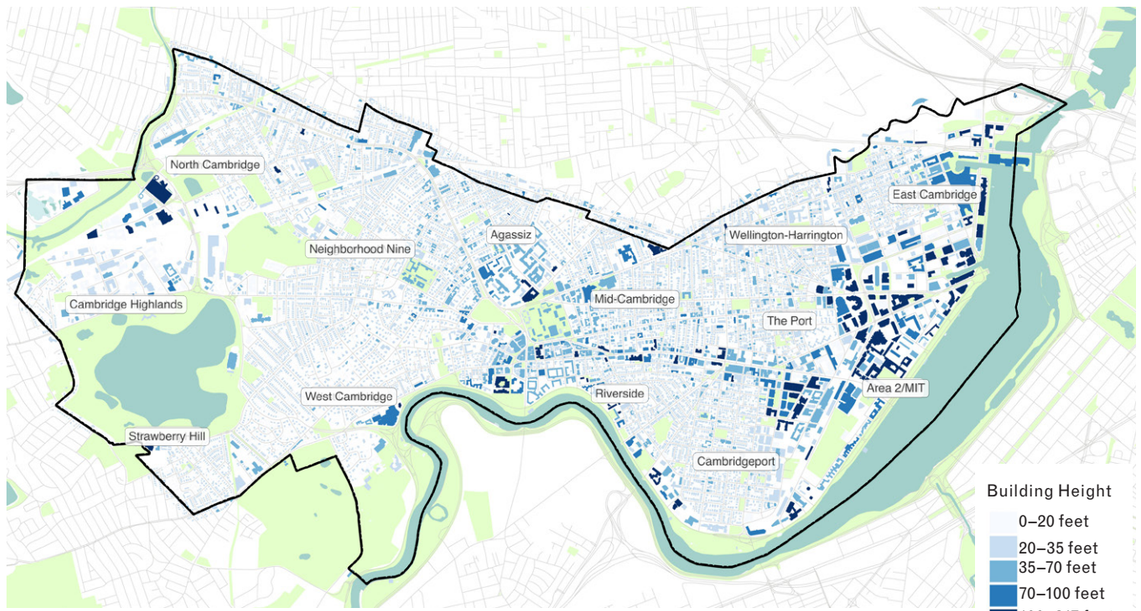
Building Density

Cambridge's squares and commercial corridors are more dense than the rest of the city, when measured by floor area ratio (FAR), building heights, and street wall. FAR is the total amount of floor space in a building compared to the amount of land the building sits on. Building heights simply measure the height of the building off the ground. Street wall describes the relationship between buildings and a street, and whether a street's buildings seem to form two metaphorical walls on each side. *(See maps "Parcels by Floor Area Ratio" above, "Buildings by Height" on page 27, and "Street Wall Index" on page 28.)*

Areas that are dense, such as Harvard Square, tend to have high floor area ratios, relatively tall buildings, and highly defined street walls. Low-density areas, such as Alewife, which look and feel characteristically suburban, tend to have low floor area ratios, lower heights, and less defined street walls.

In many ways, the patterns of density trace the history of development of the city. The neighborhoods where the city first began—Harvard Square and Old Cambridge, East Cambridge, Wellington Harrington, the Port, Cambridgeport, Riverside, North Cambridge, and Mid-Cambridge—tend to be higher density, both within the residential neighborhoods and along the corridors.

Western neighborhoods such as West Cambridge, Strawberry Hill, and Neighborhood Nine are typically less dense, with many more free-standing and single-family homes on larger parcels of land. Western Cambridge also lacks the large commercial centers like Kendall Square which ensure a large daytime population.

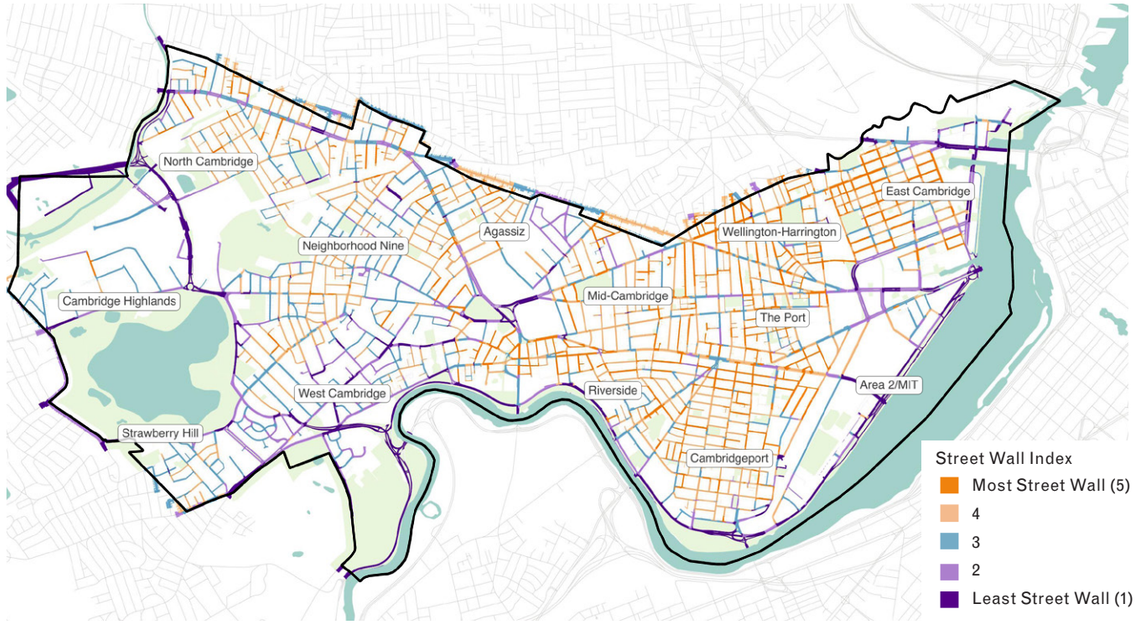




Buildings by Height

Source: City of Cambridge Community Development Department; Envision Cambridge analysis.

The tallest buildings in Cambridge are along Massachusetts Avenue, in formerly industrial districts, at the universities, and along the Charles River.



Street Wall Index

Source: City of Cambridge Community Development Department; Envision Cambridge analysis. This map shows an index of street wall that measures the relationship between street width and the arrangement buildings on either side of that street. A value of 5 represents streets with a dense arrangement of buildings around a narrow or moderately wide street. A value of 1 represents a street where there are virtually no buildings within at least 150 feet of the street's center. Streets with a low street wall index include wide parkways in suburban-style areas as well as streets flanking large open spaces.

The corridors and the older neighborhood fabric in Cambridge typically have the most street wall.

Cambridge's pattern of dense development begins to dissolve at the western and northwestern edges of the city, near Alewife and North Cambridge, and in parts of Kendall Square. In these areas, large amounts of land are dedicated to automobile travel and parking. Again, these patterns have historical roots. Streets and buildings here were often built later on landfill over marshes. These marginal lands in today's less dense areas were used for industrial or logistical purposes for much of their existence, never fully integrating with the urban form of the rest of the city. Political opposition to major road projects in those areas was typically weaker than in more densely inhabited areas.

"Street wall" is a metaphor for how enclosed the public realm feels.



Older urban commercial areas like Harvard Square typically have well-defined street walls.



Areas like Alewife, with wide roadways and "object buildings" far from their parcel lines, have little impression of a street wall.

Public Realm, Streets, and Open Space

The public realm is the collection of physical spaces that are public or generally publicly accessible. Definitionally this includes public areas like streets, squares, and parks, but also entails other technically private space where it is normal and expected for the public to be in, such as a café or a shopping mall. The public realm fundamentally connects people to place and connects people to each other, forming the background of daily life in the city. Cambridge's public realm was built over the course of four centuries and is shaped by cultural, political, and economic changes.

Squares

Cambridge is defined by its public squares. These civic spaces developed over many years at the crossings of important streets, and the squares are still central in the daily lives of Cambridge's population. *(See "Historical Development" on page 18 for more information on the development of the squares.)* Squares are also prominent in many persons' "mental map" of the city, a position underscored by the presence of transit nodes, including stops on the MBTA Red and Green lines. The most famous squares are Harvard, Central, Porter, Kendall, and Inman—though a series of less well-known squares play just as important a role in Cambridge's public realm.

Contemporary squares are most often defined by a hardscaped plaza or similar public space, surrounded by neighborhood and specialty retail. A governmental or other institutional use may also be nearby. Housing is increasingly an important feature of squares, often built above retail space.



City of Cambridge

The incorporation of transportation infrastructure into the fabric of the square brings a flow of people from around the region into these spaces. All of these elements working together are what make Cambridge's squares feel active and sociable.

Despite these similarities, each square is also unique, and they change over time. Historically, Harvard Square and the surrounding area was thought of as bohemian, and the area was notable for its large number of bookstores. Though that legacy remains, Harvard Square is increasingly known for its concentration of national retailers. In contrast, Kendall Square was a factory district facing deindustrialization in the 1960s. Today, Kendall Square is the heart of an increasingly mixed-use neighborhood and a critical node in the global economy.

Some of the squares' transitions are less dramatic, but just as powerful for everyday life. For example, the City realigned the intersection of Massachusetts Avenue and Main Street in 2009 to pedestrianize Lafayette Square. That simple move reclaimed unnecessary roadway and created a bustling plaza.

Streets and Sidewalks

In addition to serving as the primary means by which people move about the city, streets are a city's most ubiquitous public spaces. Cambridge's street pattern was largely developed before the advent of the automobile, and thus most of the city is well-scaled for pedestrian and bicycle use. However, thoughtful design is required both to safely and comfortably accommodate travel by all transportation modes and to enable streets to serve as vibrant spaces for public interaction. Key components are the roadway, the sidewalk, and the threshold between the sidewalk and the building.

The most active major roadways in Cambridge, such as Massachusetts Avenue or Cambridge Street, carry a variety of traffic modes, including automobiles, buses, pedestrians, and bicycles. Not all portions of these streets equally serve all users, however. The needs of all users must be considered, but safety and consideration for vulnerable users are given priority. This means, for example, allowing pedestrians to cross streets at intuitive places, and ensuring that traffic of all kinds moves efficiently, but not very fast— as dangerous traffic can undermine streets' role as public space. Meanwhile, neighborhood streets, being relatively narrow, calm traffic to very slow speeds. The actual width of the roadway is less relevant than how that space is allocated to general traffic (including automobiles), to bike lanes (both physically separated and not), to on-street parking, and to public transit. Many design features which help balance the needs of different users—narrow travel lanes, curb extensions, midblock crossings, raised crossings, and more—are already found in many parts of Cambridge. Massachusetts Avenue north of Harvard Square and some street segments in West Cambridge are more auto-oriented than in denser parts of the city.

> "I love the historic character combined with cultural/intellectual life, the future-oriented economy, the beauty of the city, and the sense of active street life..."
>
> —Huron Village resident

Commonwealth-controlled streets like Memorial Drive and Alewife Brook Parkway are also atypical for Cambridge, lacking features designed for safety and support for all users.

In addition to roadway design, sidewalk design is critical to foster the use of streets as public spaces. Wide sidewalks on the city's main street accommodate people walking, tree plantings, street furniture like benches and newspaper racks, and semipublic uses like outdoor dining. These sidewalks are often at least 20 feet wide, like those in the heart of Central Square. Medium-width sidewalks, like the 16-feet-wide sidewalks on Broadway a few blocks from the Kendall Square MBTA station, are adequate in areas with less foot traffic.

Neighborhood streets, like those in North Cambridge, often have sidewalks that are only 5 to 10 feet wide, enough space for residents to stroll and for trees to shade the area. Sidewalks in the Alewife Quadrangle and along Fresh Pond Parkway are of similar sizes as neighborhood sidewalks, but they are not always continuous or well-maintained. Unlike sidewalks in residential neighborhoods, these narrow Alewife sidewalks abut heavy traffic.

As more demands are placed on the public realm—to accommodate foot traffic, public transit queuing, community space, and more—Cambridge must allocate space so that the public realm can harmonize these uses. Cambridge has experimented with new designs (such as shared streets) to address the changing nature of street space.





Central Square's 20-foot sidewalks (left) and the Alewife Quadrangle's nonexistent sidewalks (right) offer two extremes in designing the street as public space.

Ground Floors and Public-private Thresholds

The threshold between the public space of the street and the private spaces of buildings impacts the activity on, and usefulness of, a street. Historic development patterns (such as those seen along much of Massachusetts Avenue, Cambridge Street, and parts of Concord Avenue) created streets lined with many buildings, each with a narrow street frontage. On main streets, this meant every block had a variety of activities, creating a vibrant atmosphere, business agglomerations, and interdependencies that helped the space function economically. Mid- and late-twentieth-century buildings (such as those in Kendall Square) tend to forsake this historic pattern for long stretches of wall with few doors, large setbacks filled with ornamental landscaping, and opaque building frontages. These designs detract from both the social vibrancy and economic function of urban streets.

Contemporary developments are attempting to revive the traditional pattern of public-private thresholds through semipublic and varied uses and designs: retail, sidewalk cafés, awnings, and frontages with many doors.

Open Space

Approximately 14% of Cambridge's land is dedicated open space, and 95% of residents are within a half-mile walking distance of such a space.[13] Open spaces are critical for a city's people to exercise, relax, appreciate more natural environments, form community bonds, debate, organize, learn, and play. Given the mature urban fabric, the relatively dense population, and the wide distribution of open spaces across the city, the quality of the open space resources is as important as the quantity and distribution of open spaces.

Since the 1970s, Cambridge has created about 100 acres of new parks, plazas, and playgrounds.[14]

Over half of this open space development occurred at Danehy Park. More open spaces, including the Eastern Cambridge / Kendall Square Open Space, are currently under development. During this same timeframe, approximately 25 million square feet of new buildings that have emerged in the city—a significant amount of growth for a city with 6.43 square miles of land area.[15] The new open spaces, when carefully coordinated with new developments and growth areas, are essential to humanizing the new environments and integrating them with the existing fabric of the city.

13 City of Cambridge Community Development and Assessing departments
14 See City of Cambridge Open Space Plan or http://www.cambridgema.gov/CDD/planud/urbandesignprimer
15 Envision Cambridge analysis, CDD







Top: Traditional thresholds between the public street and private buildings encouraged interaction and movement between the two types of space.

Bottom left: Mid-twentieth-century design closed off the threshold between public and private through opaque facades, large setbacks, and avoidance of semipublic ground floor uses.

Bottom right: New developments have reintroduced street-activating ground-floor uses, in order to bridge the public street and private building.

Cambridge's distribution of open spaces and the scale of those spaces varies across neighborhoods. For instance, only 1% of land area in Agassiz is dedicated to public open space, while that figure is 42% for Strawberry Hill.[16] Of all buildings in Cambridge, 91% are within a quarter-mile of some open space.[17]

However, these open spaces often function in very different ways, and not all community members have access to all types of spaces. For example, Hoyt Field is primarily devoted to active recreation, while Fresh Pond offers more opportunities for a quiet stroll. Plazas like those at Porter or Lafayette squares are less focused on green amenities, but serve as crucial civic gathering spaces. *(For more information on Cambridge's squares, see "Squares" on page 29.)* Not all people in Cambridge are within an easy walking distance to multiple forms of open space, and some people must cross dangerous parkways like Memorial Drive or Alewife Brook Parkway in order to reach their nearest open space.

14% of city land is dedicated open space and 91% of buildings in Cambridge are within a quarter-mile of open space.

The Charles River Reservation is of particular importance among Cambridge's open space resources, as its linear geography connects the riverfront to many neighborhoods. The Reservation, and the riverfront generally, are not used to their full potential as community resources.[18] Connections between the neighborhoods and the riverfront are impeded by Memorial Drive and its crossings, which are unappealing and perceived as dangerous. Commercial and institutional uses on large-scale "superblocks" further disconnect residential communities from the Charles River Reservation. Recently developed green infrastructure connecting neighborhoods to the riverfront, such as the newly reconstructed Western Avenue, help fix this issue.

Cambridge has 13 privately owned public spaces.

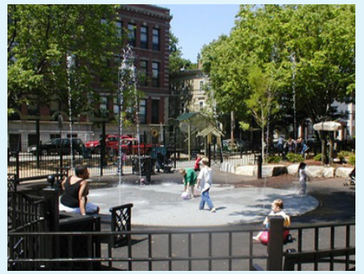
Privately owned public spaces (POPS) also contribute to Cambridge's open space landscape. Over the course of some development approval processes, the Cambridge Planning Board will require the developer to dedicate some of their property to the public as an open space.[19] Each POPS is regulated differently, but these public spaces exist in perpetuity regardless of who owns each site.[20] The City and developers have completed 13 such POPS around the city, including parks at Broad and Lechmere canals and plazas in Kendall and Harvard squares.[21] Though they must be regularly scrutinized and regulated, POPS create a convenient mechanism to provide additional open space without public land ownership—a necessary function in cities such as Cambridge, where demand for land drives up costs for new open space development.

16 City of Cambridge Community Development Department; Envision Cambridge analysis
17 Ibid.
18 During the Listening and Visioning phases of public engagement, many residents noted the riverfront as a site for improvement.
19 City of Cambridge, Special Permit Public Open Spaces, 2017
20 Ibid.
21 Ibid.

Cambridge's open spaces include small plazas, areas for sports and exercise, spaces for passive recreation, and large parks with bodies of water such as Fresh Pond Reservation.

The city's public open spaces can be publicly or privately owned.


The Lawn at City Hall


Dana Park


Clement Morgan Park


Danehy Park


Lafayette Square


Broad Canal


Alewife Brook Reservation


Harvard Square


Charles River Reservation

Population

Cambridge has been growing for several decades and is likely to approach its peak 1950 population within 10 to 20 years. As Cambridge's role in the local, regional, and world economy has evolved, the composition and distribution of the city's population has changed. The city has an uncommonly high proportion of young adults and foreign-born residents, in part due to its institutions and major industries. The economic boom of recent years has continued to drive changes in the composition of the population, including the hollowing of the city's middle class. Some of these changes mirror national or regional trends, but others relate to Cambridge's institutions, jobs, proximity to Boston, high quality of life, or high cost of living. Cambridge must aim to maintain the city's high quality of life, while supporting a diverse population and creating a cohesive community.

Learn more about . . .

"Population Growth and Change in Household Structure" on page 39

"Age Structure and Growth in Student Population" on page 39

"Education" on page 45

"Race and Immigration" on page 46

"Income" on page 49

"Health" on page 51

"Policy Context: Social and Human Services" on page 50



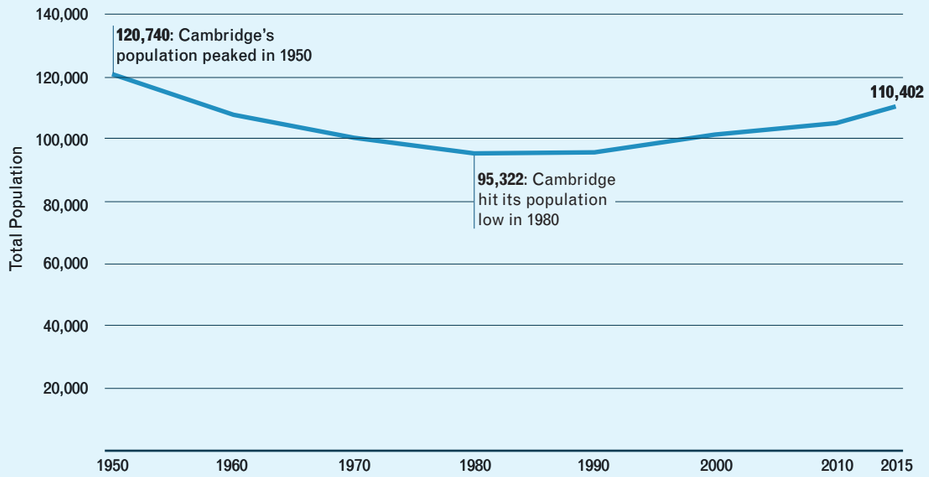
Cambridge Today Population

Cambridge's population has been growing steadily since 1980, although the city is still not as populous as it was in 1950.

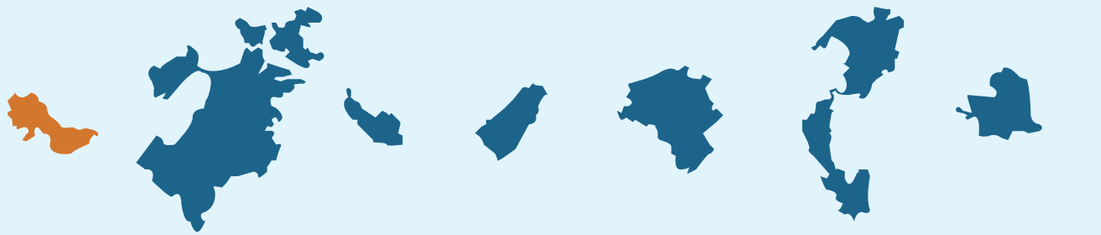
Cambridge is only 8% the size of Boston by land area, but its population is 16% that of Boston's.

Among comparable neighboring towns and cities (Boston, Somerville, Brookline, and Newton), only Somerville is denser. Two California cites, Berkeley and Palo Alto, are comparable to Cambridge in population size, and are similarly home to top-tier research universities and prosperous, innovation-driven economies.

Population, 1950–2015



Sources: US Census, 1950–2010; Census Bureau Annual Population Estimates, 2015



Cambridge Area: 6.43 sq. mi. Pop: 110,402 17,170/sq. mi.

Boston Area: 48.28 sq. mi. Pop: 667,137 13,818/sq. mi.

Somerville Area: 4.12 sq. mi. Pop: 80,318 19,495/sq. mi.

Brookline Area: 6.80 sq. mi. Pop: 59,132 8,696/sq. mi.

Newton Area: 18.10 sq. mi. Pop: 88,817 4,907/sq. mi.

Palo Alto, CA Area: 23.88 sq. mi. Pop: 67,015 2,806/sq. mi.

Berkeley, CA Area: 10.47 sq. mi. Pop: 120,972 11,554/sq. mi.

Population Growth and Change in Household Structure

The US Census Bureau estimated Cambridge's population to be approximately 110,400 in 2015, having grown by 14,600 residents since 1990.[1] Population growth has been relatively steady since 1990. While the population continues to grow toward the city's historic 1950 peak population of 120,740, today's population is quite different than that of 1950.[2] The number and proportion of families in Cambridge has steadily dropped, while the number of nonfamily households has grown, particularly the number of people living with roommates and unmarried couples.[3] In 1950, the average household contained 3.27 persons. By 2010, Cambridge reported just 2.00 persons per household, compared to 2.48 in Massachusetts and 2.58 in the US.[4] *(See "Average persons per household, 1950–2010" on page 41 for a visualization of household sizes over time.)* The disparity between Cambridge and other communities can be attributed to a number of factors. While household size has declined in cities across the US, Cambridge's household size has also dropped due to the growing population of young professionals who can afford to live alone and a relative lack of housing that is affordable and attractive to families compared to neighboring communities.

Cambridge households contain an average of 2 people.

1 US Census, 1990–2010; Census Bureau Annual Population Estimates, 2015
2 US Census, 1950–2010; American Community Survey (ACS) 2010–2014 5-year estimates
3 Ibid. A household is all the people who occupy a housing unit, regardless of how many people there are or if they are related. A family is a group of people living together who are related by birth, marriage, or adoption. Most families constitute a single household, but a household could have multiple families. Not all households are families, such as households of roommates. People living in group quarters (such as college dormitories, shelters, or nursing homes) are not counted in households, but are counted in the total population.
4 US Census, 1950–2010





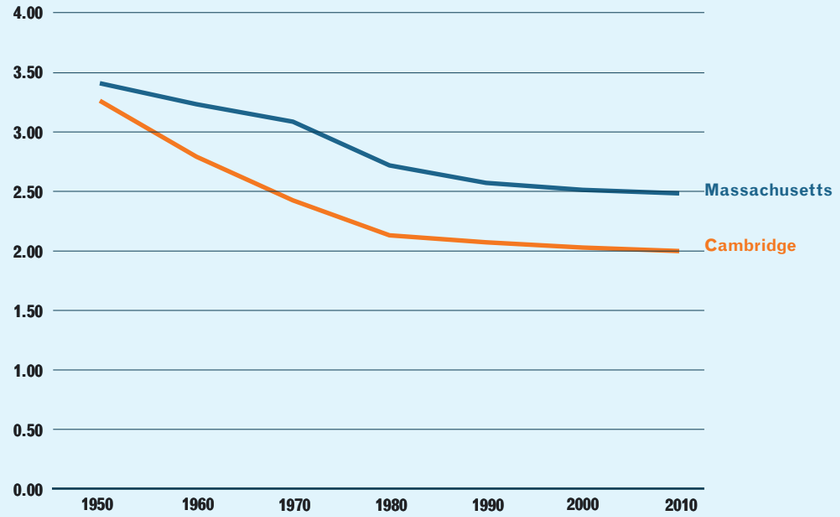
Above: Relaxing in Lafayette Square



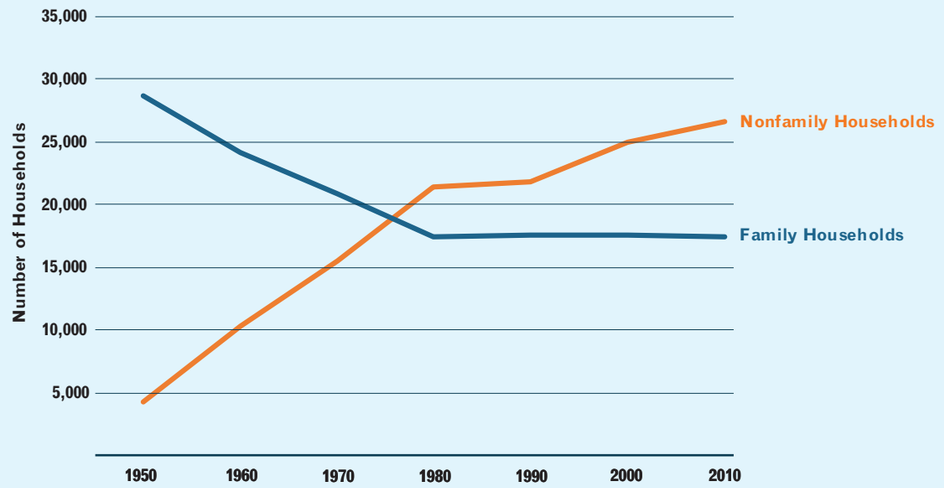
Left: Strolling along Massachusetts Avenue

The size of Cambridge households has decreased significantly since 1950, as the number of nonfamily households has grown.

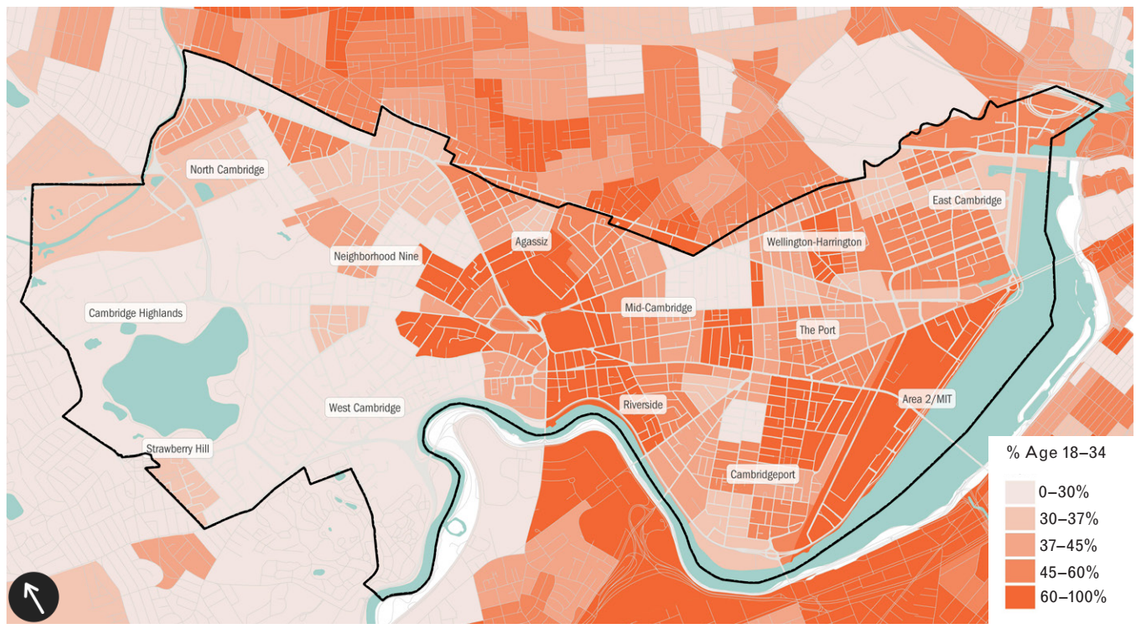
Average persons per household, 1950–2010



Composition of households in Cambridge, 1950–2010



Source: US Census, 1950–2010



Population age 18 to 34

Source: American Community Survey, 2010–2014 5-year estimates

Age Structure and Growth in Student Population

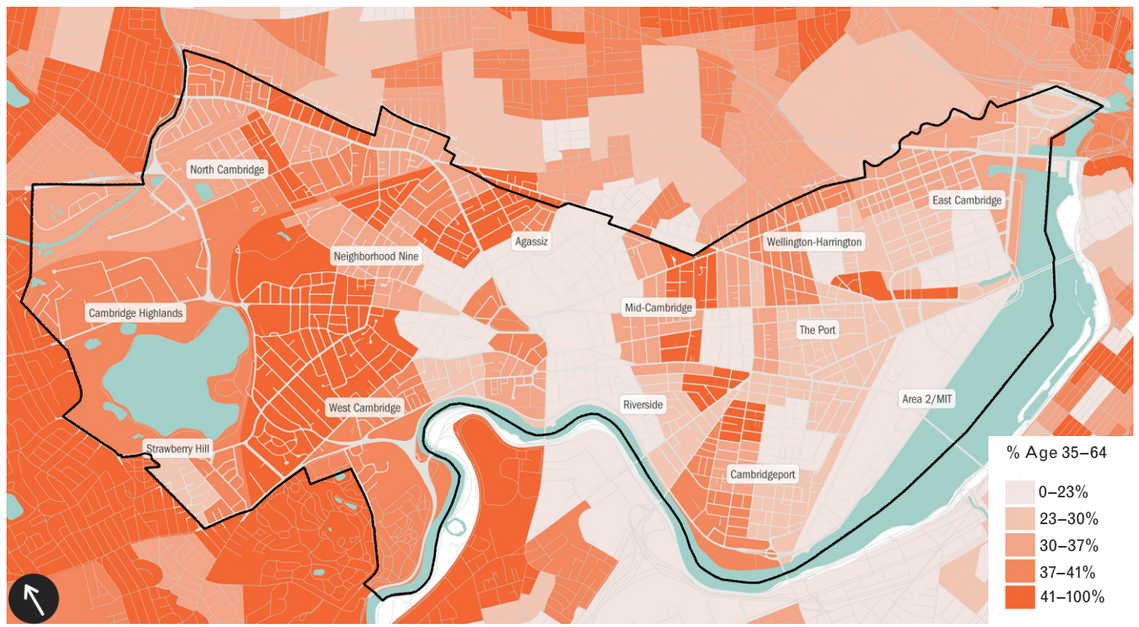
The age structure of Cambridge's population is similar to nearby Boston and Somerville, but distinct from the outlying suburban communities in the Boston region. Almost half of Cambridge's population is between the ages of 18 and 34.[5] Some of Cambridge's large proportion of young adults is attributable to Cambridge's student population. Between 2000 and 2015, the university student population living in Cambridge grew 23% (4,201 students), from 18% to 20% of the total population.[6] *(See "University-affiliated population living in Cambridge, 2000–2015" on page 44 for more information.)*

Cambridge has a low proportion of children under 18 compared to surrounding communities and Massachusetts as a whole.[7] However, between 2000 and 2010, the number of 0- to 4-year-olds grew.[8] Birth rates suggest this trend has continued. The increase in very young children is likely linked to the increase in the 25- to 34-year-old population, as well as an increase in the proportion of women age 35–42 choosing to have children.[9] The number of 5- to 14-year-olds fell between 2000 and 2010, following a pattern seen in other cities, in which families leave the city as children reach school age. School enrollment data since 2010 shows an increase in the number of older children, suggesting the city may be reversing that pattern.

Between 2000 and 2015, the university student population living in Cambridge grew 23%.

In addition to the small proportion of children and adolescents, Cambridge's cohort of residents age 65 and older is also low compared to nearby communities, though this group has grown as the large Baby Boomer generation ages.[10]

5 ACS, 2010–2014 5-year estimates
6 City of Cambridge Town–Gown Reports, 2000 and 2015; US Census, 2010; Census Bureau Annual Population Estimates, 2015
7 ACS, 2010–2014 5-year estimates
8 US Census, 2000–2010
9 ACS, 2010–2014 5-year estimates
10 Ibid.

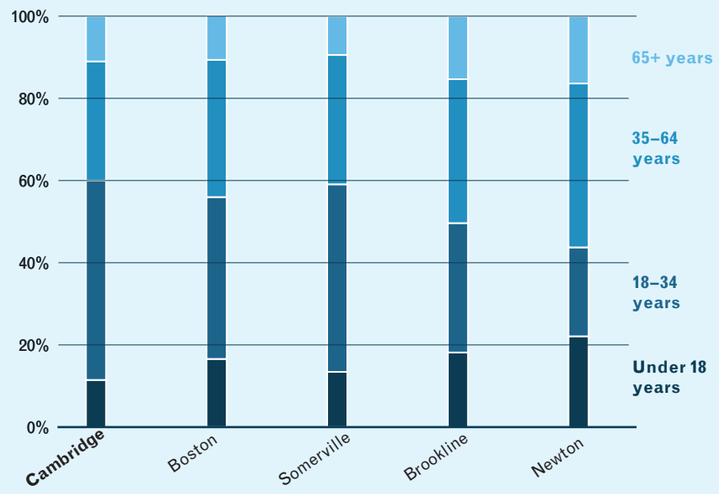


Population age 35 to 64

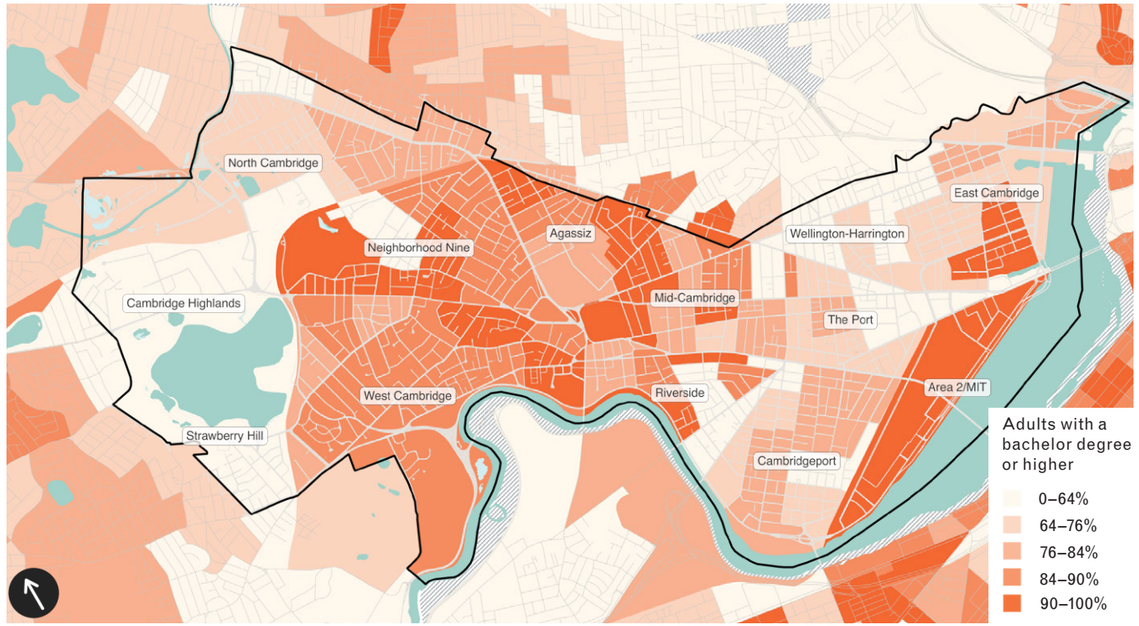
Source: American Community Survey, 2010–2014 5-year estimates

Almost half of Cambridge residents are between 18 and 34 years old.

Age Structure, 2010–2014



Source: American Community Survey, 2010–2014 5-year estimates

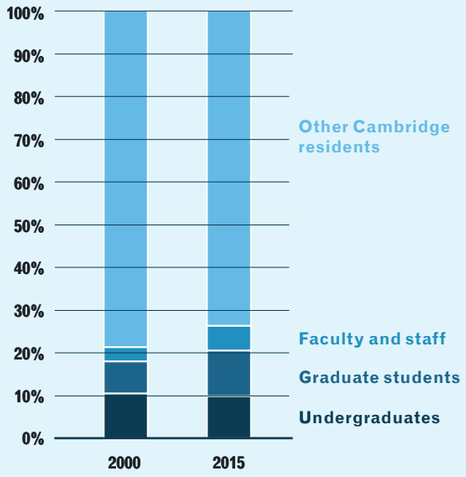


Percent of adults with a bachelor degree or higher

Source: American Community Survey, 2010–2014 5-year estimates

Graduate students and university staff are now a larger portion of Cambridge's population.

University-affiliated Population Living in Cambridge, 2000–2015



Source: City of Cambridge Town–Gown Reports, 2000 and 2015; US Census, 2010; Census Bureau Annual Population Estimates, 2015. Figures include students living both in and out of institutionally affiliated dormitories.

Education

Since 1980, Cambridge's population with a bachelor's degree or higher has grown from roughly 42% to 75% of the population, making Cambridge one of the most highly educated incorporated cities in the nation.[11] In the Commonwealth as a whole, only 40% of the population has a bachelor's degree or higher.[12] Cambridge residents' educational attainment varies by race, however. Of the white population, 80% has a bachelor's or advanced degree, while that figure is only 31% for black residents and 58% for Latino residents.[13]

"Cambridge should be a community where all kinds of people can live and prosper."

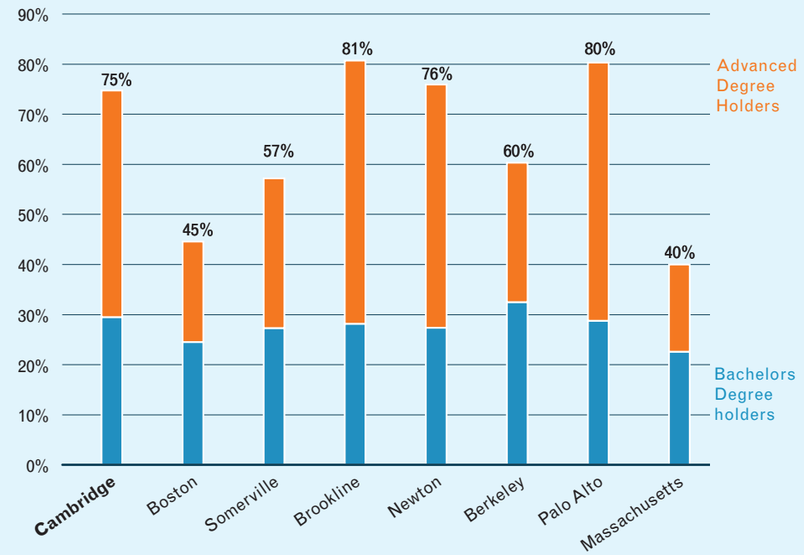
—North Cambridge resident

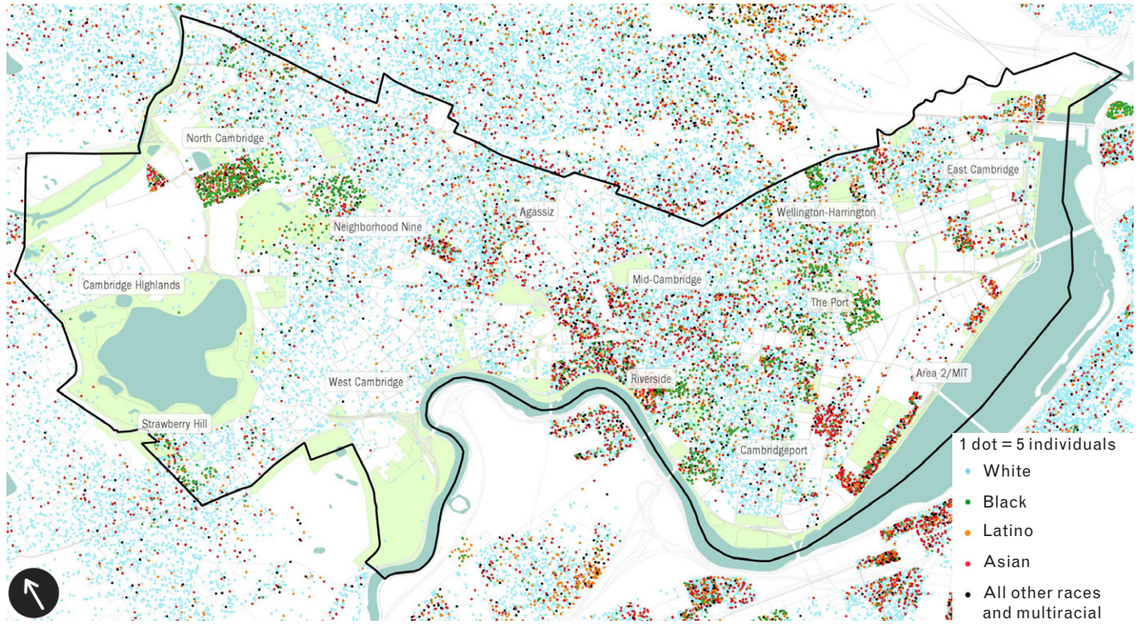
11 US Census, 1980–2010; ACS, 2010–2014 5-year estimates
12 ACS, 2010–2014 5-year estimates
13 Ibid.

Cambridge is one of the most highly educated cities in the nation, second only to Palo Alto.

Source: American Community Survey, 2010–2014 5-year estimates

Educational Attainment, Bachelors and Advanced Degrees





Population density by race and ethnicity

Source: American Community Survey, 2010–2014 5-year estimates. Races and ethnicities are self-identified. The US Census defines Latino identity as an ethnicity, and Latinos can identify as any race. The map above shows only those not identifying as Latino in each specified racial category, showing Latino residents as a separate category. Dots do not indicate exact locations but are based on US Census block groups.

Race and Immigration

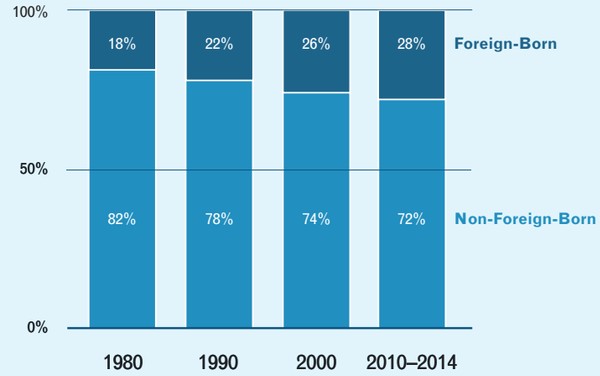
Cambridge grew steadily more diverse in its racial and ethnic composition from 1950 to 2000.[14] In 2010, 38% of Cambridge residents were people of color, while that figure was less than 5% in 1950. The proportion of black residents nearly doubled in the 1970s and 1980s. Only 1% of Cambridge residents were Asian in 1960, whereas now 15% of the city marks Asian on the census. While the city has become more racially and ethnically diverse overall, all areas of the city are not equally diverse. Communities of color tend to be more clustered in specific areas, while white residents are found throughout the city. Overall, neighborhoods throughout the city are more integrated by race and ethnicity than many similarly wealthy and neighboring communities.

Cambridge has a relatively large foreign-born population.[15] The city has long been a port of first arrival for immigrants. Cambridge's internationally recognized universities and globally active industries have contributed to growth in Cambridge's foreign-born population. Since 1980, the proportion of foreign-born Cambridge residents increased from 18% to 28%.[16] While people of diverse national origins live throughout the city, particularly large concentrations of foreign-born residents are found in East Cambridge, the Port, and North Cambridge.[17]

14 All observations on race and ethnicity are based on US Census, 1950–2010; ACS, 2010–2014 5-year estimates
15 ACS, 2010–2014 5-year estimates; City of Cambridge Neighborhood Statistical Abstracts, 2016 (US Census, 2010 data)
16 US Census, 1950–2010; ACS, 2010–2014 5-year estimates
17 Ibid.

Cambridge's foreign-born population has grown steadily since 1980.

National Origins, 1980–2014



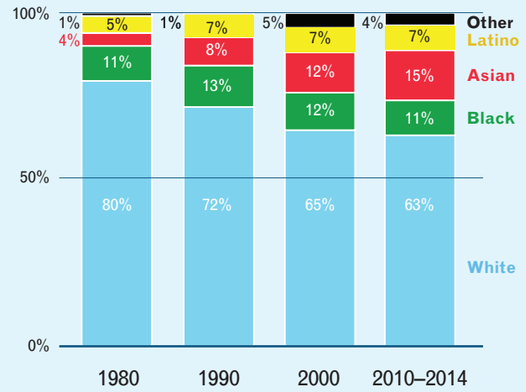
Source: US Census, 1980–2000; American Community Survey 2010–2014 5-year estimates

"Cambridge should be united across differences: geographic, racial/ethnic, socioeconomic, language, generations, etc."

—Mid-Cambridge resident

Cambridge grew more racially and ethnically diverse from 1980 to 2000.

Racial and Ethnic Composition, 1980–2014

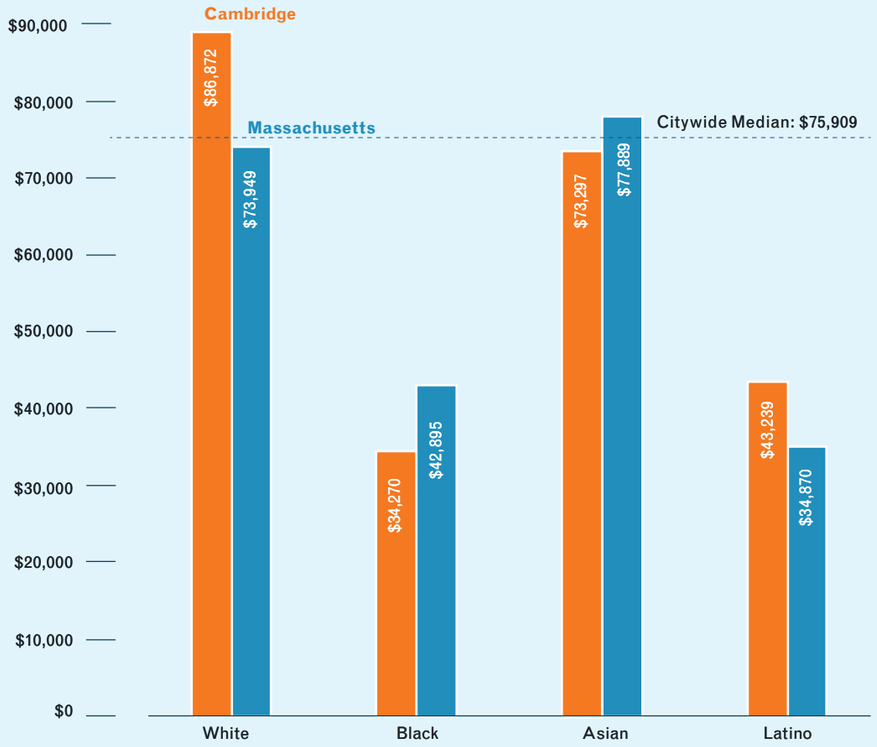


Source: US Census, 1980–2000; American Community Survey 2010–2014 5-year estimates

Median incomes in Cambridge vary by race and ethnicity.

Cantabrigians of color tend to have lower incomes than white Cantabrigians. Read more about Cambridge residents' incomes at "Income and Economic Security" on page 74.

Median Household Income by Race and Ethnicity



Source: American Community Survey, 2010–2014 5-year estimates. Races and ethnicities are self-identified. The US Census defines Latino identity as an ethnicity, and Latinos can identify as as any race. The chart above shows only those not identifying as Latino in each specified racial categories, showing Latino residents as a separate category. Due to high margins of error that make comparisons unreliable, other Cenus race categories were omitted from this chart.

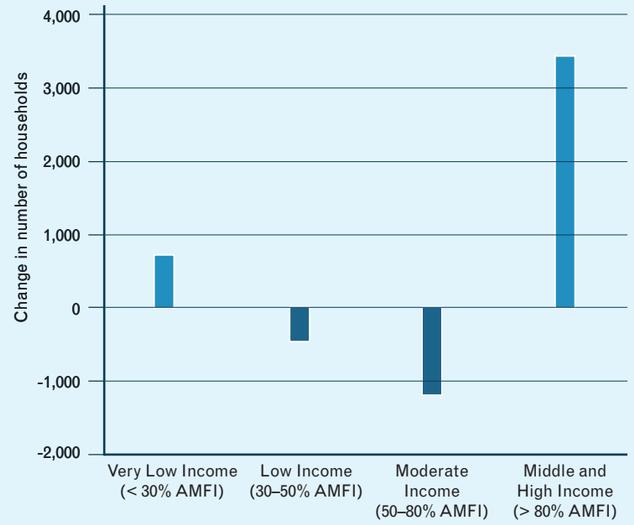
Income

Between 2000 and 2013, Cambridge lost an estimated 1,600 households making between 30% and 80% of the Boston region's median family income (AMFI)—that is, between $28,300 and $94,400 for a family of 4 in 2013.[18] The majority of those losses occurred among renting households, particularly renters with incomes between 50% and 80% of AMFI. Cambridge gained 600 households making very low incomes (less than 30% AMFI), but the city gained more than 4 times that many households making above 80% AMFI. In short, Cambridge is becoming less economically diverse and more economically polarized, as low- and moderate-income households look for housing elsewhere and only the very-low-income (often graduate students or those with housing support) and high-income households can stay.

This trend—often called the "hollowing middle"—likely has many roots. Because the data does not track the incomes and movements of individual households, the loss of low- and moderate- income households could in theory signal rising wages. That is unlikely, however, given the data on wage growth in industries that typically employ low- and moderate-income people. *(See"Wages and Wage Growth" on page 85 for more information on wages, but note that section discusses wages for people who work in Cambridge, a group that does not totally overlap with Cambridge residents.)* It is more plausible that low- and moderate-income households left the city. One cause many residents point to is the increasing unaffordability of housing. (*Read more about housing affordability at "New Housing in Cambridge Neighborhoods" on page 64.*)

18 All analysis in this section is based on US Dept. of Housing and Urban Development, Comprehensive Housing Affordability Strategy data, 2000 and 2009–2013

Change in Number of Households by Annual Income, 2000–2013



Cambridge is losing its economic diversity as low- and moderate-income households leave the city.

Source: HUD, Comprehensive Housing Affordability Strategy data, 2000 and 2009–2013. Income brackets follow definitions used by the Federal Financial Institutions Examination Council.

"Gentrification should mean we all get better, not have to move out."

— Mid-Cambridge resident

Policy Context: Social and Human Services

Across departments, the City of Cambridge works to provide high quality services to a diverse range of residents. These programs work in multifaceted ways to support and empower various communities living in Cambridge. This list is a limited selection of such programs.

Support for individuals and families

- The Department of Human Service Programs and community not-for-profits provide after school and summer programs for more than half of the City's children from kindergarten through 8th grade. More than 1,100 youth age 14 to 18 participated in the City's summer jobs program, building their skills and working in city and community sites. Over 700 families with children under age 8 participated in strengths-based parenting education programs and activities to support them as their child's first teacher.

- The Cambridge Continuum of Care, a network of 33 individual programs from 18 organization, work to create and enhance systems to meet the needs of the city's homeless population. The Cambridge Coordinated Access Network aims to make homeless services more accessible for clients by using a common assessment tool for all who are unhoused and prioritizing housing for those most in need. The Multi-Service Center offers direct case management service to homeless and at-risk individuals and families.

- The Council on Aging provides a wide variety of services for Cambridge residents age 60 and older, including information and referral, case management, and a variety of health and enrichment classes and events, as well as breakfast and lunch daily, six days a week.

Empowering the Community

- The Community Learning Center (CLC) helps adults improve their lives and participate in their communities through English as a Second Language and citizenship classes, preparation for the High School Equivalency exam, a Bridge to College Program, and integrated education and training programs. The CLC serves over 900 adult students a year.

- The Community Engagement Team conducts outreach to underserved and minority communities through its Outreach Workers, who come from Cambridge's various linguistic and/or underserved communities. The Community Engagement Team connect residents to services, supports leadership within different communities and provides technical assistance to departments and agencies on the best engagement strategies.

- The Office of Workforce Development provides free job search assistance to Cambridge residents and helps them access training opportunities. *(See "Policy Context: Economic Development" on page 78 for more information on their efforts.)*

- The Birth to Third grade partnership, a collaboration between Cambridge Public Schools and the Department of Human Service Programs, provides scholarship assistance to high-quality preschools for 3- and 4-year-old children from low income families. The partnership also provides quality improvement support to community preschools, behavioral health support for children in preschools and family childcare homes, and workshops for early childhood staff and families.

Health

In 2015, the City of Cambridge released its Community Health Improvement Plan (CHIP), which names four priority areas: mental/behavioral health and substance abuse; violence; healthy, safe, and affordable housing; and healthy eating & active living. Health equity, social justice, and health access are foundational values driving each of the priority areas.[19] The plan outlines goals, objectives, and strategies, as well as indicators (both currently tracked and proposed) to measure progress. Envision Cambridge will ultimately propose strategies that impact community wellbeing, housing, mobility, urban form, the economy, and the environment—each of which plays a role in furthering health equity, social justice, and health access.

Compared to the population of the Commonwealth generally, Cambridge residents are relatively physically healthy, particularly when considering most measures of circulatory health (heart disease and stroke), overall cancer rates, nervous system health (Alzheimer's and Parkinson's disease), respiratory health (asthma, emphysema, pneumonia), early childhood health (including lead poisoning, teen births, and infant mortality), diabetes hospitalizations, rates of unintentional injury and violence, substance abuse, and rates of regular exercise.[20]

There is a lower rate of diabetes hospitalization in Cambridge than in the commonwealth, but diabetes mortality in Cambridge is greater. Foodborne illnesses, tuberculosis, hepatitis B, and gonorrhea are all more common in Cambridge than in Massachusetts generally. Rates of HIV contraction and the number of people living with HIV/AIDS is greater in Cambridge than in the commonwealth. The rates of mental health hospitalizations and suicides are also greater in Cambridge than in Massachusetts.

In some cases, these rates attest to Cambridge's colocation of high quality services, which together offer more support to people with complex health needs than other communities. Urban planning can help foster such a supportive environment, as well as planning for better health outcomes overall.

19 "Community Health Improvement Plan," City of Cambridge, 2015
20 Analysis in this section is all drawn from rates in "Cambridge Health Indicators," City of Cambridge, 2015

Riverside Press Park



Cambridge Today Housing

Housing

Housing access and affordability is one of the most pressing issues facing the city. Longtime residents, including families that have called Cambridge home for generations, live alongside people drawn by the city's top-tier universities, booming industries, and many amenities and opportunities for enrichment. With growing demand for housing, prices have risen—across the Boston region, not just in Cambridge. This demand creates two conditions: an overall lack of housing options that are affordable and increased housing construction. The overall lack of housing options is particularly acute for families and others with less flexibility in their housing choices. Meanwhile, some communties feel the new housing is inadequate for Cambridge's needs. The crisis is also linked to ongoing homelessness and the broadening market for short-term rental housing. Cambridge must address these challenges in order to fully embrace its values of diversity, equity, and livability.

Learn more about . . .

"Housing Costs and Affordability" on page 54

"Housing tenure, race, and neighborhood" on page 60

"New Housing" on page 62

"New Housing in Cambridge Neighborhoods" on page 64

"Housing Options" on page 66

"Lending and Foreclosures" on page 67

"Affordable Housing" on page 68

"Homelessness" on page 69

"Emerging Issues" on page 70

"Policy Context: Housing" on page 58

Housing Costs and Affordability

Between 2000 and 2015, home prices increased on average more than 7% per year for condominiums and 9% for single-family homes.[1] Unlike much of the country, Cambridge housing prices did not decline during the Great Recession. Instead, they held steady near their prerecession peaks and began to grow swiftly as the recession abated, beginning in 2010.

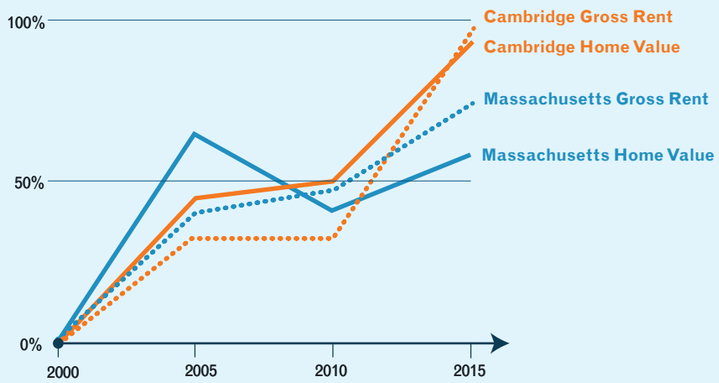
The median home price in 2015 was $1,150,000 for 1- to 3-family homes, and $612,000 for condominiums.[2] Home prices grew across all Cambridge neighborhoods, with prices more than doubling throughout the city from 2000 to 2015 (not adjusted for inflation).[3]

The strong demand for housing started in the 1990s and has accelerated since the end of the Great Recession. In 1994, Massachusetts voters approved an initiative that prohibited rent control across the commonwealth.[4] Around that time, the regional housing recession came to an end, and Americans' demand for urban living began to grow.

1 Cambridge Housing Market Profile, 2016
2 Ibid.
3 Ibid.
4 While Cambridge voters disapproved of the measure, statewide sentiment led to a prohibition of rent control statewide. For more information on the effects of the end of rent control on the Cambridge real estate market, see David Autor, Christopher Palmer, and Parag Pathak, "Housing Market Spillovers: Evidence From the End of Rent Control in Cambridge, Massachusetts," National Bureau of Economic Research Working Paper No. 18125, June 2012

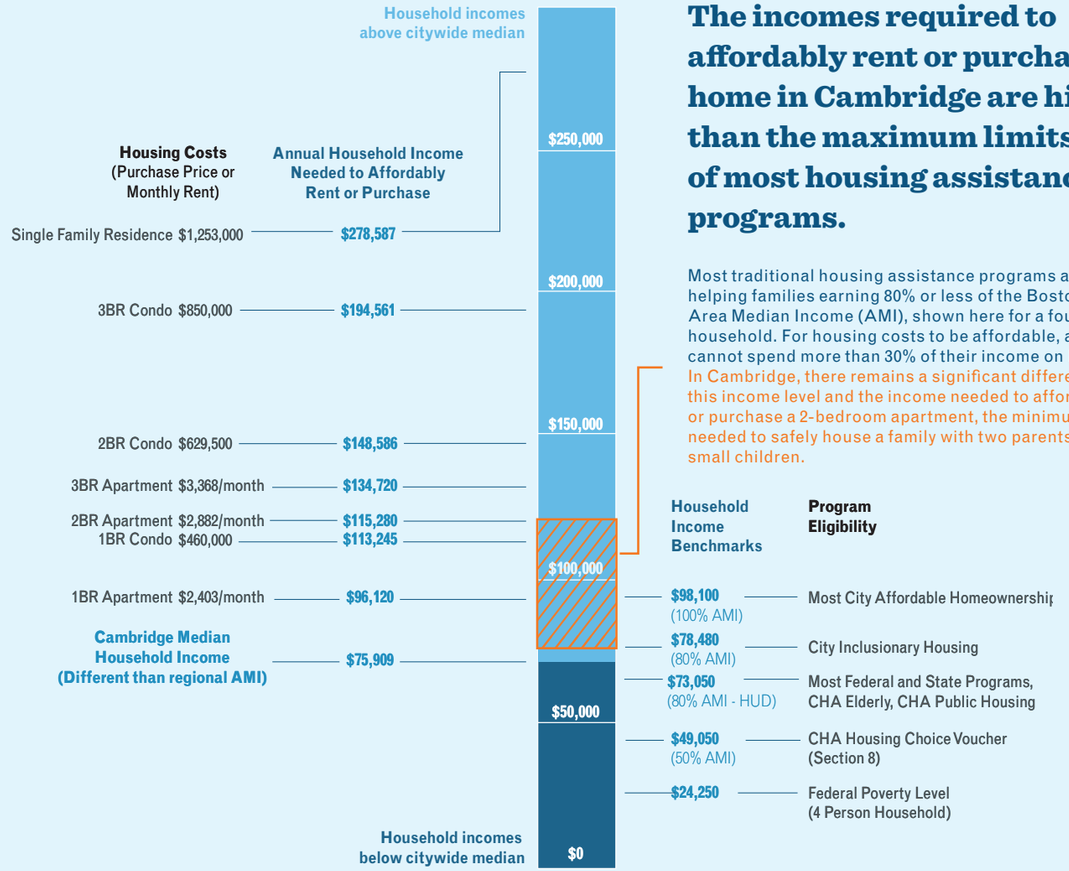
Unlike the Commonwealth, Cambridge's home prices did not dip during the Great Recession, and growth in rents has accelerated since 2010.

Percent Change in Median Rent Growth and Home Value, 2000–2015



Source: US Census, 2000–2010; American Community Survey, 2011–2015 5-year estimates; Zillow Home Value Index, 2000–2015. Graph reflects figures from every five years, beginning in 2000.

The incomes required to affordably rent or purchase a home in Cambridge are higher than the maximum limits of most housing assistance programs.

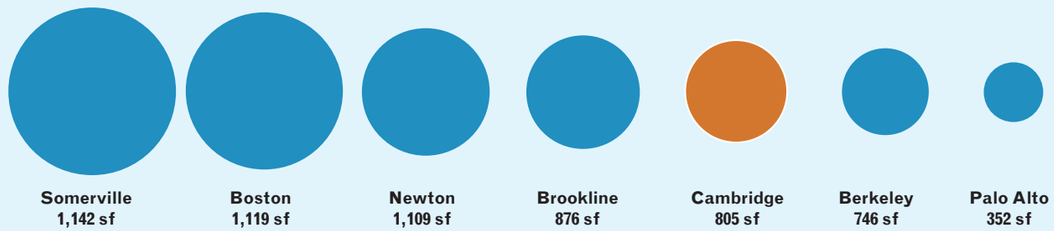


Most traditional housing assistance programs are aimed at helping families earning 80% or less of the Boston region's Area Median Income (AMI), shown here for a four-person household. For housing costs to be affordable, a household cannot spend more than 30% of their income on housing. In Cambridge, there remains a significant difference between this income level and the income needed to affordably rent or purchase a 2-bedroom apartment, the minimum space needed to safely house a family with two parents and two small children.

Sources: For program eligibility and market prices: Cambridge Housing Market Profile, 2016. Costs of utilities are not accounted for. Income required for purchase assumes a 30-year fixed rate mortgage at 4.00% with a 10% downpayment, PMI of 0.50%, monthly HOA fee of $350, and annual homeowners insurance of $1000.

Cambridge's home prices and rents have nearly doubled since 2000. Today, $500,000 would afford you about this much space . . .

Based on Median Home Value, 2015



Source: Zillow Home Value Index

Following the end of rent control, decontrolled rents skyrocketed, increasing by around 40% in just three years, starting a trend that set the stage for today's affordability crisis.[5]

In 2015, Cambridge's median home value per square foot was $622.[6] That is 39% more expensive per square foot than Boston's housing.[7] Nearby, only Brookline approaches Cambridge's housing costs on a per square foot basis.[8] Cambridge's median home price per square foot is, however, slightly less expensive than that of Berkeley, California, and is 57% less expensive than housing in Palo Alto, California—two cities with economic and demographic profiles similar to Cambridge's.[9] This suggests that despite today's high prices, there is likely room for further price growth as the region's knowledge economy continues to grow.

Renting in Cambridge is also increasingly expensive. The median rent in Cambridge stood at $3,145 per month in 2015.[10] Between 2000 and 2015, rents grew 64% for 1-bedroom units, 70% for 2-bedroom units, and 90% for 3-bedroom units.[11] Apartments within a half-mile from Cambridge's MBTA Red Line stations typically rent for a premium of several hundred dollars per month, including a $530 per month premium paid to rent near Kendall Square.[12] *(See "Median Gross Rent" on page 60 for a map of rents in Cambridge.)* After adjusting for number of bedrooms and proximity to MBTA stations, rents in Cambridge are $500 greater than rents in Somerville or Allston.[13]

Renting in Cambridge costs $500 more than renting similar homes nearby.

While existing Cambridge homeowners can benefit from rising prices through increased home equity, rent increases present a significant challenge for Cambridge's renters. Steep rent increases can force tenants out of their homes and can destabilize communities.

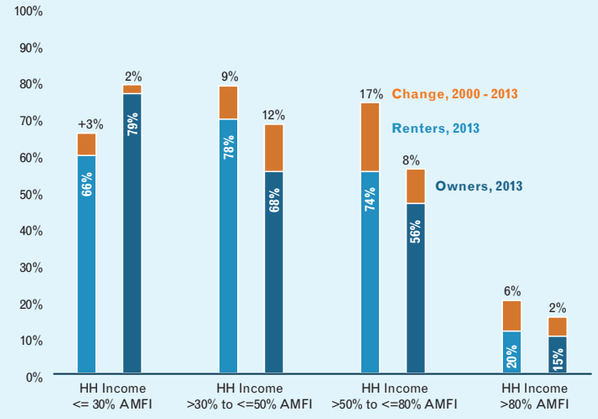
According to Cambridge's 2016 Inclusionary Housing Study, the gross household income needed to affordably rent a Cambridge 1-bedroom is now more than $100,000, well above most income thresholds for many housing assistance programs.[14] Overall, Cambridge's high housing costs leave roughly 40% of households cost-burdened, meaning they spend 30% or more of their income on housing.[15] Housing affordability is a critical challenge across the income spectrum, directly impacting households with a wide range of incomes.[16] Increasing unaffordability also threatens to destabilize families and neighborhoods, as those unable to afford rapidly rising rents in market-rate housing must search for homes in less expensive areas. As price distinctions between Cambridge neighborhoods have increasingly eroded, the entire city faces a displacement crisis caused by rising values.

5 David Autor, Christopher Palmer, and Parag Pathak. "Housing Market Spillovers: Evidence From the End of Rent Control in Cambridge, Massachusetts," National Bureau of Economic Research Working Paper No. 18125, June 2012
6 Zillow Home Value Index, 2015
7 Ibid.
8 Ibid.
9 Ibid.
10 Cambridge Housing Profile, 2016
11 Ibid.
12 Ibid.
13 Ibid.
14 Cambridge Inclusionary Housing Study, 2016
15 Source: HUD, CHAS data, 2000 and 2009–2013
16 U.S. Department of Housing and Urban Development, CHAS data, 2000 and 2009–2013



Compared to households of other incomes, moderate-income households are becoming "housing cost-burdened" at the fastest rate in Cambridge.

Growth in Housing Cost-Burdened Households by Income



"Housing cost burden" means a household pays more than 30% of their income for housing. In this data, households are divided into groups based on their income relative to the median income for families in the Boston region, called the "area median family income" (AMFI). This is similar to the Area Median Income discussed on page 55, but is derived only from the income of family households, who tend to have more income than nonfamily households.

Source: US Department of Housing and Urban Development, CHAS data, 2000 and 2009–2013

Policy Context: Housing

Many housing policies in Cambridge focus on addressing affordable housing needs, for renters as well as homeowners. The City implements several mechanisms to develop and preserve income-restricted affordable housing and to incentivize homeownership. As of 2016, nearly 15% of the city's housing stock is income-restricted and affordable, including nonprofit-sponsored housing, public housing, privately owned affordable units, inclusionary housing, and affordable homes purchased by first-time homebuyers through other programs. This list is a limited selection of the City's housing programs, which also target housing stability support for vulnerable residents, expanding housing diversity, and creating healthy and sustainable housing.

Affordable Housing Development and Preservation

- The City and its Affordable Housing Trust offer low-cost financing to support the efforts of local housing development organizations to create new affordable housing units, to convert market-rate units to affordable units, and to preserve the affordability of existing units. This housing includes both rental and homeownership units, and encompasses permanent suportive housing for the formerly homeless.
- Since its inception, the Trust has provided financing for the creation and preservation of 2,600 affordable rental and homeownership units in Cambridge. There are nearly 4,000 nonprofit and private income-restricted affordable housing units in Cambridge as of 2016.

Inclusionary Housing

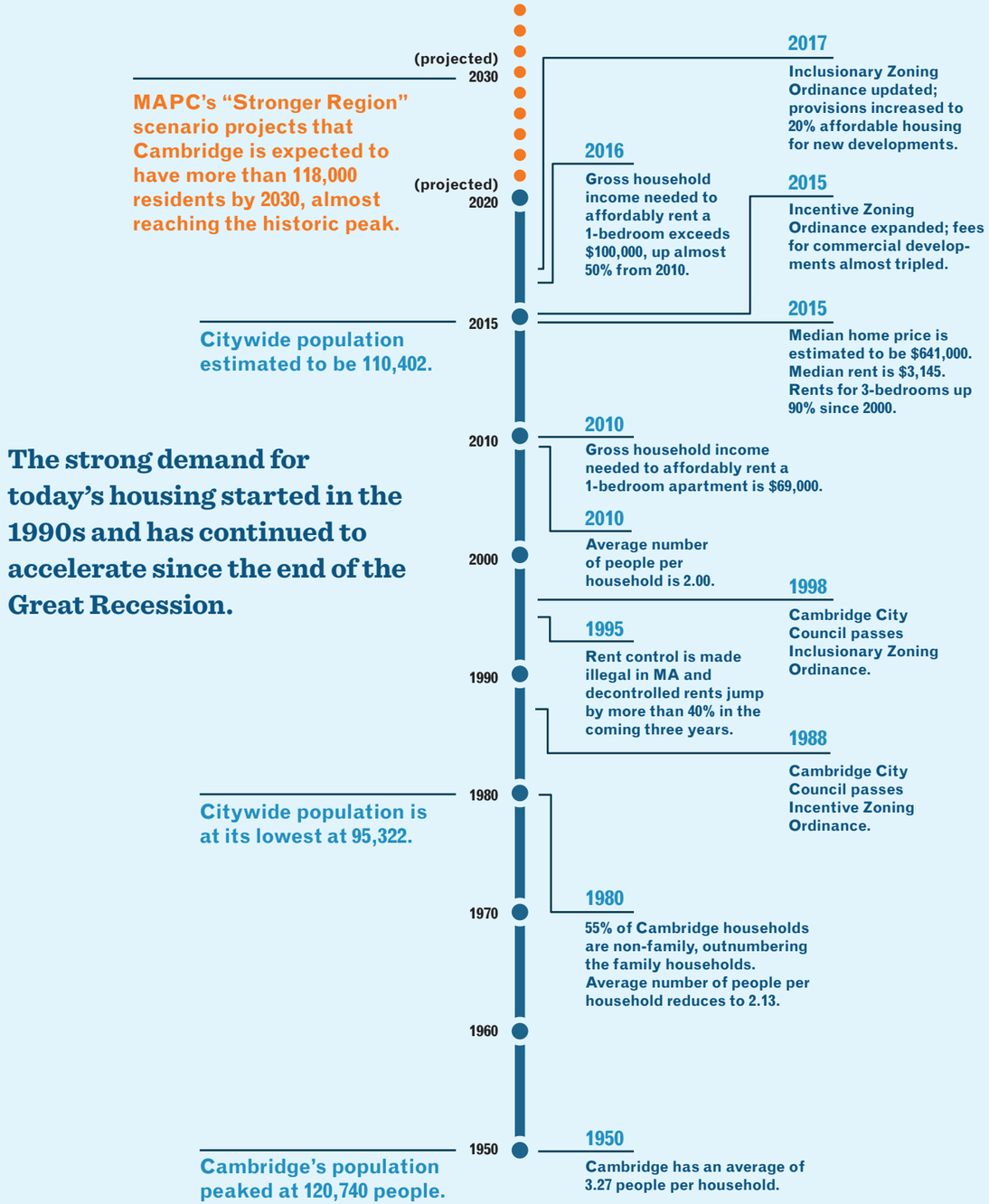
- Enacted in 1998, the Inclusionary Housing program requires a portion of housing units in new housing developments be held as affordable to residents of certain incomes. Initially the City required 15% be held as affordable; in 2017, the City updated the law and increased the requirement to 20%. The updated law also includes a provision to increase the number of 3-bedroom units. As of 2016, there were 920 income-restricted affordable housing units provided through the inclusionary housing program (either completed, permitted, or in construction).

Incentive Zoning

- Incentive zoning links large commercial development to affordable housing development by requiring developers pay a fee into the Affordable Housing Trust. In 2015 the City undertook an Incentive Zoning Nexus Study to review the existing ordinance, analyze the projected impact of nonresidential development on the need for new affordable housing, and make recommendations for changes. The City Council enacted that study's recommendations in 2016. The updated ordinance nearly tripled the City's commercial development linkage fee, which will increase annually through 2018 and will continue to be pegged to inflation.

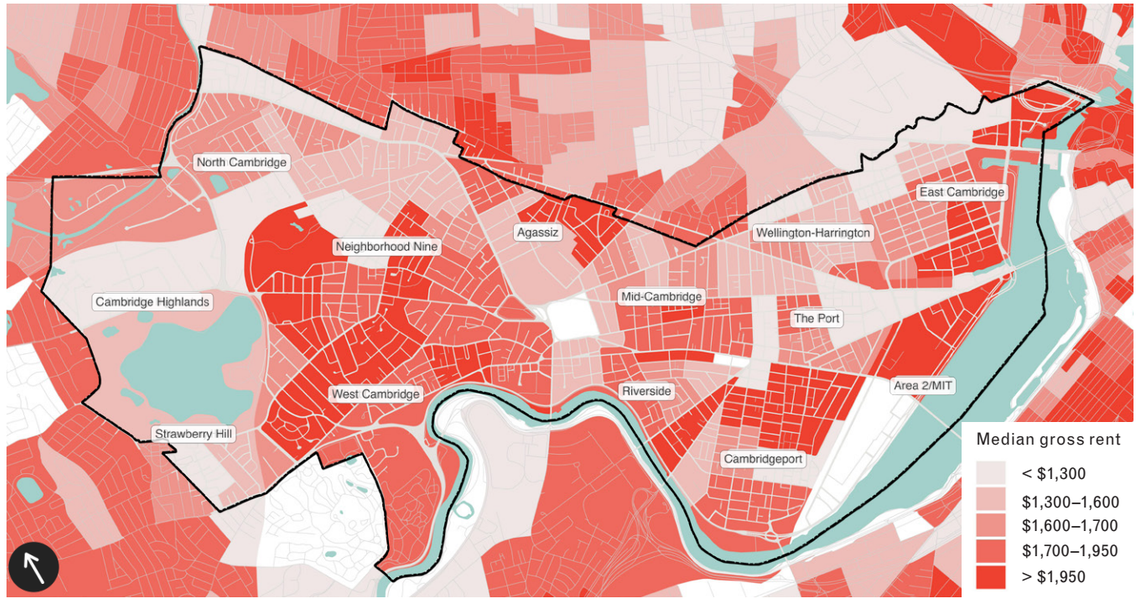
Homeownership Programs

- The City offers affordable ownership units to qualified homebuyers, as well as downpayment assistance. In Fiscal Year 2016, 16 homebuyers purchased an affordable home through a city program. Additionally . the city manages access to more than 500 affordable homes created with City assistance.
- The City offers a residential property tax exemption for all homeowners, resulting in tax savings of over $2,000 annually. Further abatements are available for qualifying homeowners, such as the elderly or disabled veterans.
- The City also offers homeownership education and counseling, prepurchase counseling, and workshops to help potential homebuyers.



The strong demand for today's housing started in the 1990s and has continued to accelerate since the end of the Great Recession.

Source: US Census 1950–2015; American Community Survey, 2010–2014 5-Year estimates; Zillow Home Value Index, 2015; City of Cambridge Housing Profile, 2011 and 2016, MAPC Population Growth Projections, 2014. The "Stronger Region" scenario explores how changing demographic trends could result in higher population growth, greater housing demand, and a substantially larger workforce.



Median Gross Rent

Source: American Community Survey, 2010–2014 5-year estimates.

Median gross rents reflect rents paid by tenants, excluding any housing assistance payments and including the cost of utilities. This data includes affordable housing as well as market-rate units.

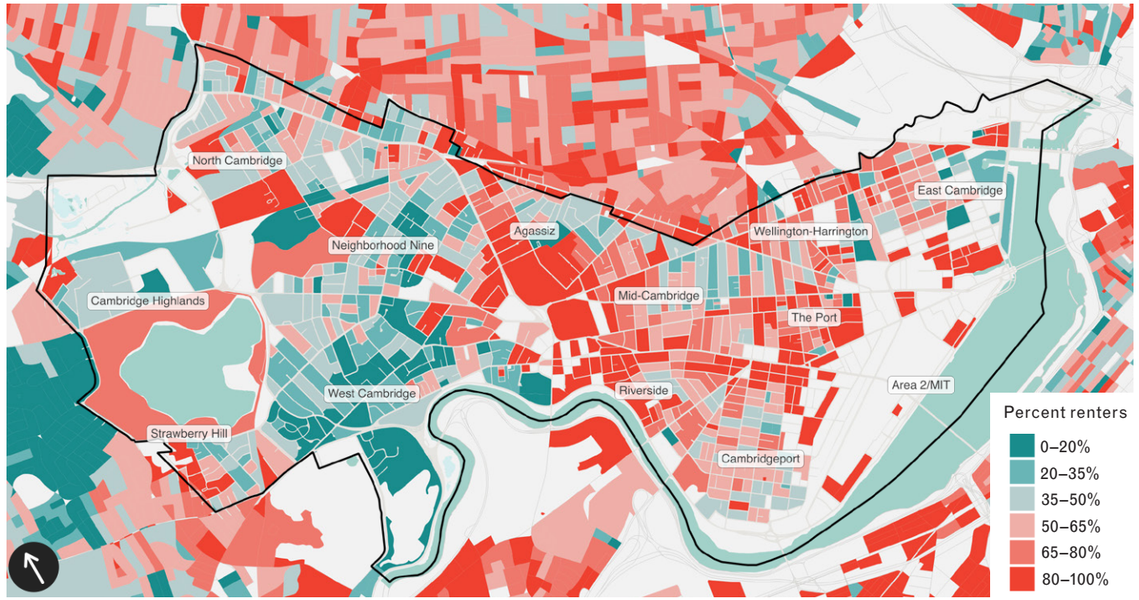


Housing Tenure and Race

The rate of homeownership in Cambridge is roughly comparable to the neighboring cities of Boston and Somerville, considerably higher than similar cities elsewhere in the country like Berkeley and Palo Alto, but still lower than in other comparable cities such as Austin, TX or Arlington, VA.[17] Certain areas of Cambridge have a mix of renter- and owner-occupied units, but other areas are mostly occupied by renters, particularly next to the universities.[18]

The city has low rates of home-ownership among its black and Latino residents: 18% and 13%, respectively, compared to a home-ownership rate of more than 40% among white residents.[19]

17 American Community Survey, 2010–2014 5-year estimates
18 Ibid.
19 Ibid.

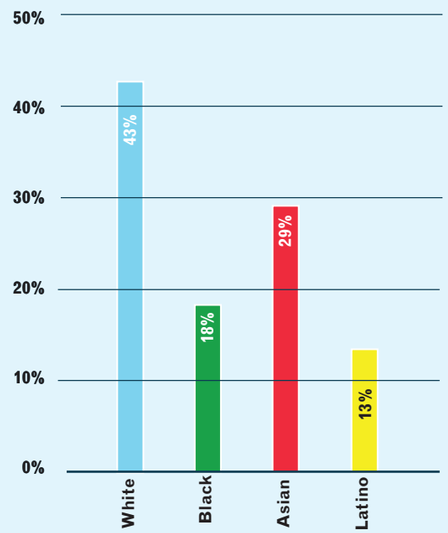


Percentage of Renter-occupied Units

Source: American Community Survey, 2010–2014 5-year estimates

The rate of homeownership among white residents is more than twice that of black and Latino residents.

Homeownership by Race and Ethnicity



Source: American Community Survey, 2010–2014 5-year estimates

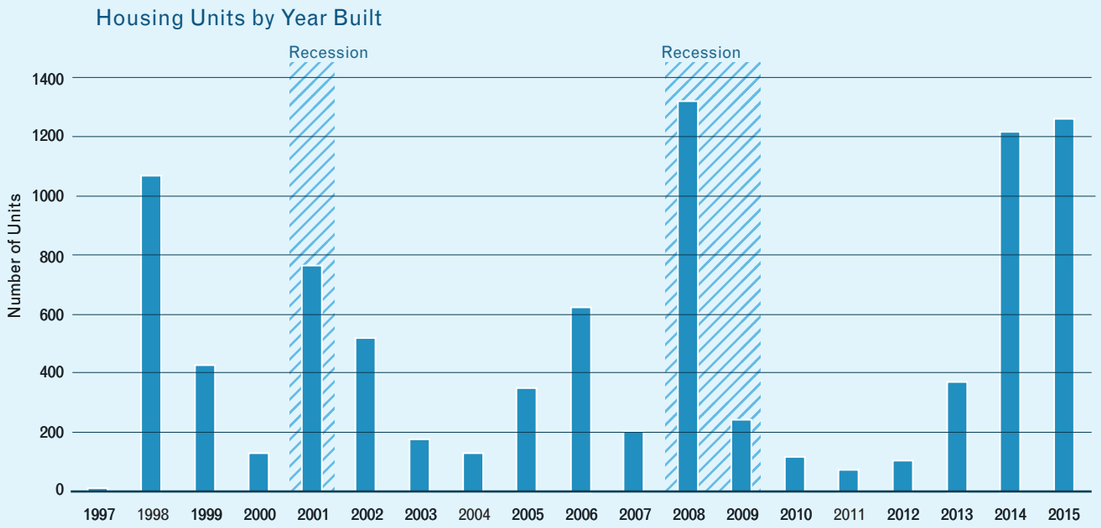
New Housing

Housing production in Cambridge greatly increased since the economic downturn of the early 1990s.[20] In 2001, the City of Cambridge conducted a significant rezoning that prioritized residential uses throughout the city and contributed to this increase in housing production. Though housing production has trended upward, the opening of new housing units varies year to year according to real estate market cycles. Production also varies greatly by neighborhood. Since 1990, East Cambridge, Cambridgeport, the Alewife Quadrangle, and North Cambridge gained a large number of units, while other neighborhoods saw more modest growth.[21] Much of this new housing was built in formerly industrial areas (such as Alewife) that were converted to residential use through the rezoning and redevelopment efforts of the last few decades.

New housing production in Cambridge is constrained by a variety of factors with local and regional origins. The city faces high regional housing construction costs and high regional land costs. Land is especially expensive in Cambridge. Furthermore, Cambridge has a decreasing number of large land parcels with economically inefficient uses that enable large amounts of housing development. In cities with lots of underutilized land and in Cambridge's previous redevelopment efforts, such parcels have allowed housing developers to act without disrupting stable, "built out" neighborhoods. In Cambridge today, where those opportunities are more rare, new housing production relies increasingly on "infill" development. The share of development projects building 1 to 3 units per building increased from 57% to 69% between 2001 and 2015.[22]

20 HUD housing permit data, 1980-2015; Cambridge Development Log, 1997-2015.
21 Cambridge CDD, Neighborhood Profiles, 2014
22 Cambridge Housing Market Profile, 2016

More than 2000 new housing units were built in Cambridge between 2014 and 2015.



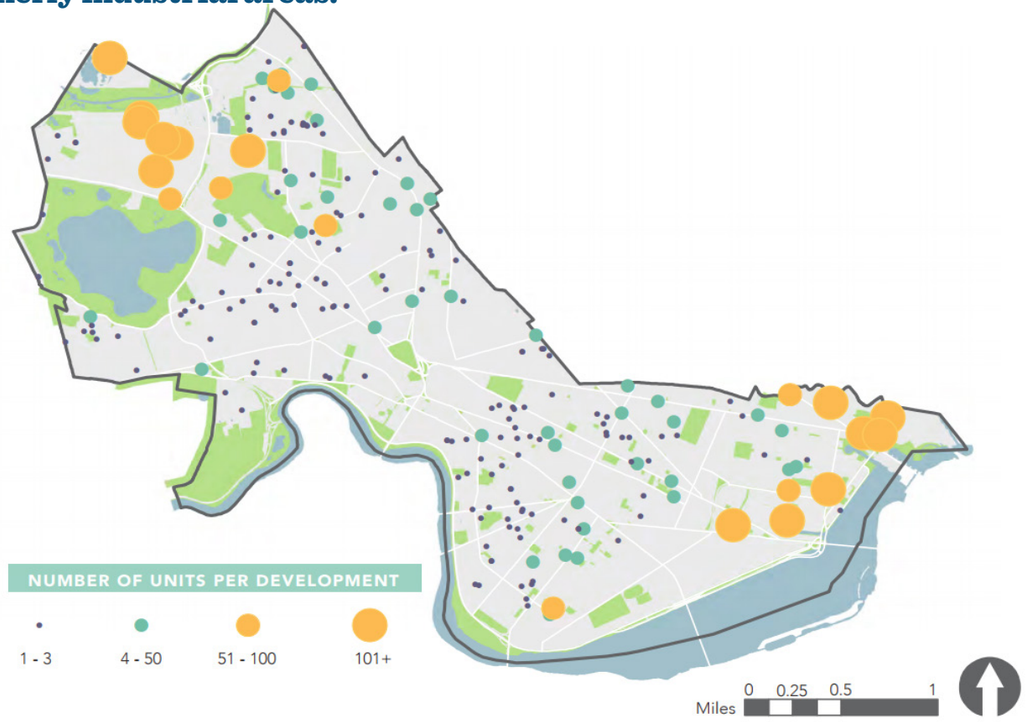
Source: City of Cambridge Community Development Department - development log



"Simultaneously addressing income inequality and owner/developer expectations of housing prices is key."

—Cambridge resident via online survey

Cambridge's new, large multifamily development has mostly occurred in formerly industrial areas.



New Housing by Number of Units, 2010–2016
Source: Cambridge Housing Market Profile, 2016

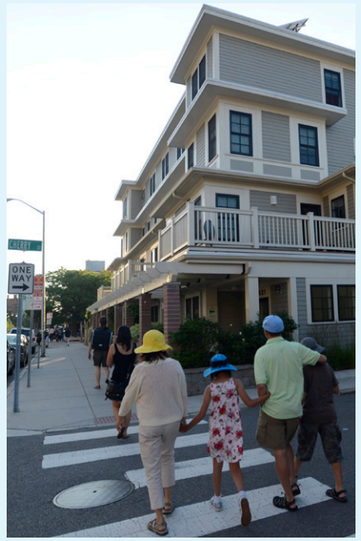
Cambridge Today Housing

New Housing in Cambridge Neighborhoods



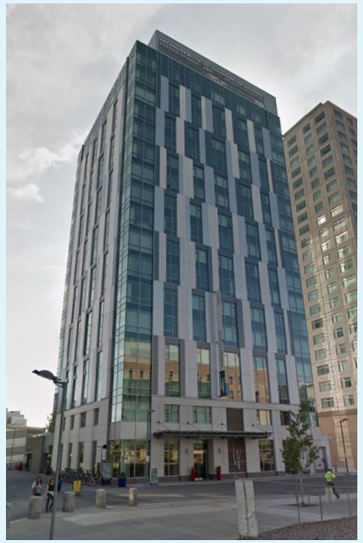
North Cambridge and Cambridge Highlands

These areas have seen significant residential development in the past 15 years, especially since 2011. Midrise, multifamily housing became more viable here for developers when City regulations began encouraging housing in former industrial areas like Alewife, through the Concord-Alewife Plan (2006), and as the market has sought new opportunities for housing near transit. Recent developments and those going forward largely locate outside the traditional, low-rise residential neighborhoods, in favor of former industrial areas.



Wellington-Harrington and the Port

These neighborhoods have experienced relatively little development in recent years, as they have fewer sites available for redevelopment. A good deal of the development here has been affordable housing. Market-rate housing developers are beginning to take an interest in the area, though, as demand for Cambridge housing continues to grow. While developers built one 11-unit market-rate project in this area from 2011–2016, several projects are currently under consideration.



East Cambridge and Area 2/MIT

East Cambridge has seen high-rise and midrise residential development on former industrial land, especially around Kendall Square and at North Point, which was the result of decades of community planning and the citywide growth policy. North Point development will substantially change the character of one corner of the city. These areas are in close proximity to Kendall Square, MIT, and public transit, thus high-income workers generate demand for housing here. However, housing here competes with more profitable office and lab uses, which are similarly attracted to the area.



Cambridgeport, Mid-Cambridge, and Riverside

Low- and mid-rise housing has dominated residential development in these neighborhoods since 2000, particularly on formerly industrial land in Cambridgeport. Past plans have advocated for focused density at Central Square, and the City recently permitted a mixed-income residential tower there. These areas are in high-demand for their central location, access to transit, and Central Square's thriving arts and culture scene.



Agassiz, Neighborhood 9, West Cambridge, and Strawberry Hill

A number of recent multifamily developments have located in these neighborhoods, particularly along commercial corridors or on vacant residential parcels. Nonetheless, most of the land here is occupied by older single-family homes, which garner some the highest prices in the city. There is occasional new, lower density housing development of single-family homes and duplexes in these neighborhoods.

Housing Options

Cambridge's diverse population necessarily has varied housing needs. Single college graduates entering the workforce seek different housing options than families of four with school-aged children. Serving these varied populations with adequate housing requires diverse housing options. People with more complex housing needs (such as families) tend to have fewer available options.

Often, these differences relate to the number of bedrooms. The great majority (75%) of Cambridge's housing has less than three bedrooms, compared to the commonwealth's 45% of housing units with less than three bedrooms.[23] Cambridge's mix of housing units is shifting toward fewer bedrooms still. Between 2000 and 2014, Cambridge added approximately 2,100 net new studios (33% of all units added), increasing the proportion of studios in Cambridge's housing stock to 9%.[24] In contrast, only 861 net new units (14% of those added) contained three or more bedrooms.[25]

People seeking housing in Cambridge encounter other variables in their housing options. Though 84% of residential buildings hold between 1 and 3 units, the plurality of housing units (39%) are found in buildings with more than 50 units.[26] Futhermore, the majority of housing in Cambridge was built before 1940.[27] This is similar to older urban locations such as Boston and Somerville, but distinct from Massachusetts and the US, where housing tends to be newer.[28]

Historically, the conversion of rental units to condominiums helped drive rental housing scarcity. These "condo conversions" were a growing phenomenon in the late 1990s and early 2000s, rising to 1,324 housing units converted to condominiums in 2004.[29] This process slowed in the wake of the Great Recession, averaging only 109 condo conversions per year since 2009, in part due to rapidly rising rents.[30]

23 ACS, 2014 1-year estimates. Given the pace of recent housing development, 5-year estimates used elsewhere are unhelpful in estimating today's unit mix.
24 US Census, 2000; ACS, 2014 1-year estimates. Reliability in these figures is an issue, however, as the data is self-reported survey data, rather than a comprehensive count of Cambridge's housing. Since the data is self-reported, the growth in units with three or more bedrooms may include units where high housing costs incentivized conversion of extra ("den") rooms into new bedrooms. With these qualifications in mind, this data should be treated cautiously.
25 US Census, 2000; ACS, 2014 1-year estimates
26 Cambridge Housing Market Profile, 2016



Most of the housing in Cambridge was built before 1940.



Lending and Foreclosures

More than 99% of mortgage loans issued to borrowers in Cambridge in 2015 were conventional private loans issued by banks or other lenders.[31] Those loans are not guaranteed by the federal government through the FHA or other agency. By comparison, roughly 84% of mortgage loans in Massachusetts are conventional loans.[32] The total number of mortgage loans made for home purchases in Cambridge has trended down since 2007, with a slight increase from 2011 and 2013.[33] Mortgage loans made to refinance a home, rather, grew significantly after 2008, only to fall again after 2012.[34]

Fewer than 1 in 10,000 properties in Cambridge were in foreclosure in August 2016.

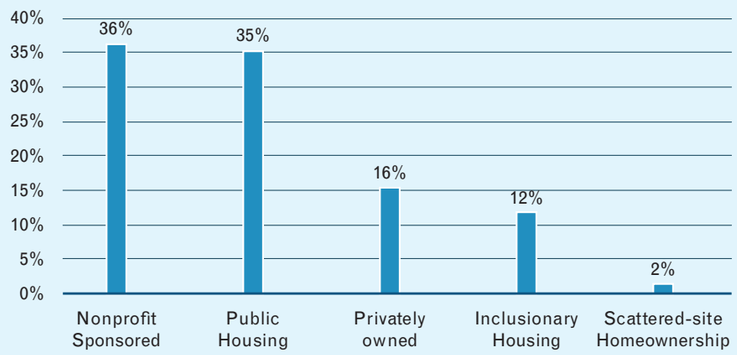
Foreclosures in Cambridge peaked between 2009 and 2010 during the national foreclosure crisis and the Great Recession.[35] In 2015, for every 10,000 properties in Cambridge, there was less than 1 property in foreclosure, compared to more than 6 foreclosures per 10,000 in Massachusetts and more than 7 per 10,000 across the country.[36]

27 ACS, 2010-2014 5-year estimates
28 Ibid.
29 Cambridge CDD, condominium conversion data 1970-2015. On average, 404 units were converted to condominiums each year between 1999 and 2008. 2004's large number of conversions was driven by an unusually large number of conversion projects, including two projects with a very large number of converted units.
30 Ibid.
31 Cambridge Housing Market Profile, 2016
32 Ibid.
33 Ibid.
34 Ibid.
35 Ibid.
36 Ibid.

More than 71% of Cambridge's affordable housing is either sponsored by nonprofits or controlled by the Cambridge Housing Authority.

Source: Cambridge Housing Market Profile, 2016

Share of Cambridge's Affordable Housing



Affordable Housing

Income-restricted affordable housing is an essential component of housing supply in today's real estate market. Affordable housing ensures a baseline supply of homes accessible to households that do not have high incomes, thereby ensuring some level of socioeconomic diversity. Of the total housing units in 2016, 14.7% (7,770 units) were held as affordable and restricted to residents of a specified income.[37] Eligible incomes vary by the program or organization keeping that housing affordable. To be affordable, a household in an affordable unit generally pays no more than 30% of their income for housing.

14.7% of housing in the city is income-restricted affordable.

Nonprofit organizations own or have sponsored 36% of Cambridge's affordable housing stock.[38] The Cambridge Housing Authority controls an additional 35%.[39] The Cambridge Housing Authority has used the federal Moving To Work (MTW) and Rental Assistance Demonstration (RAD) programs to renovate its largely older housing stock.

The remainder of Cambridge's affordable housing is either privately owned affordable units, individual units sold to low- and middle-income buyers, and units developed by market-rate developers to meet the City's Inclusionary Housing requirements.[40] From 1998 to 2016, the City's inclusionary housing policy created approximately 920 units for Cambridge residents making less than 80% of the Boston region's median income (approximately $80,000 for a family of four in recent years).[41] *(See "Policy Context: Housing" on page 58 for more information).*

37 Cambridge Housing Market Profile, 2016, citing the Cambridge Inclusionary Housing Study, 2016. Note the methods for measuring the total size of housing stock changed in 2016, thus the figures used to determine the percentage of housing units that are affordable are not strictly comparable between 2016 and previous years.
38 Ibid.
39 Ibid.
40 Ibid.
41 Overview of Inclusionary Housing Program and DRA Inclusionary Housing Study, Presentation to Planning Board, July 12, 2016. This figure includes approximately 820 completed units and 100 units permitted or under construction as of the presentation date.

Homelessness

Based on findings from the 2015 Cambridge Charrette on Homelessness, Cambridge's population experiencing homelessness remained relatively stable over the last ten years. Cambridge Continuum of Care, a consortium of service organizations devoted to the population experiencing homelessness, counted 517 persons experiencing homelessness in Cambridge during the point-in-time count in January 2016; the 2006 point-in-time count recorded 445 homeless persons.[42] Of those in the 2016 census, 23% were in families, and 11% were under 18, including 34 unaccompanied minors. The census includes people in emergency shelters, transitional housing, and unsheltered persons. An additional 447 formerly homeless individuals and 34 formerly homeless families were in permanent supportive housing in Cambridge.[43] Cambridge's total homeless population remained relatively stable from 2006 to 2016, even as the City added additional permanent supportive housing units.[44]

Cambridge Continuum of Care attributes these fluctuations in the size of the population experiencing homelessness to changes in the supply of shelter beds, and demand for those beds from people experiencing homelessness across the region.

While the census is useful, it is also important to consider the number of people served by Cambridge's homeless service organizations annually is over 3,000—though this figure does not account for overlap among organizations' clients.[45] Furthermore, the risk of homelessness is increasing, as the number of housing cost-burdened households increases. *(See "Housing Costs and Affordability" on page 54 for more information.)* Extreme increases in rents also increase the risk for

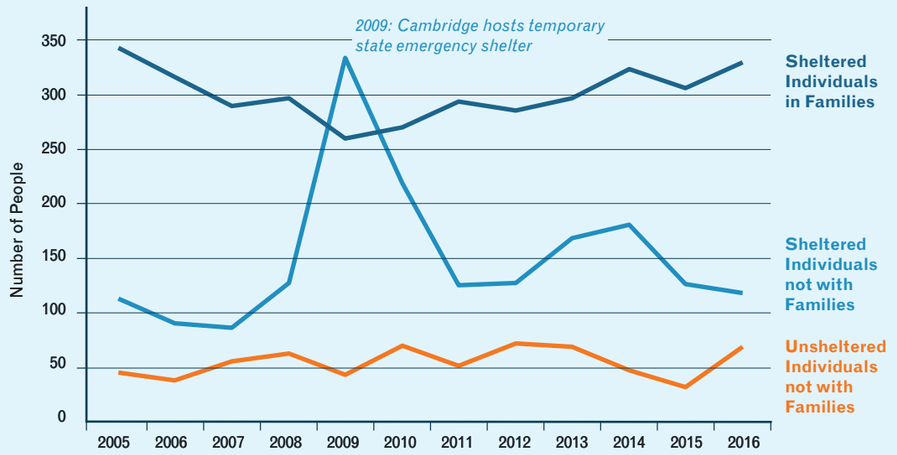
42 Cambridge Continuum of Care, Census of Persons Experiencing Homelessness, 2016
43 Ibid.
44 Ibid.
45 City of Cambridge Proposed Budget, Fiscal Year 2018

Cambridge's population experiencing homelessness has stayed relatively steady over the last decade.

Cambridge Continuum of Care conducts an annual point-in-time census of the population experiencing homelessness. Cambridge's population experiencing homelessness is thus anyone in a Cambridge shelter or found unsheltered in Cambridge on that night.

In 2009, the number of sheltered families increased significantly because the Commonwealth used a Cambridge motel as an emergency shelter. The closing of that temporary shelter did not correspond with an increase in the number of unsheltered families or individuals.

Shelter Status for Population Experiencing Homelessness, 2005–2016



Source: Cambridge Continuum of Care, Census of Persons Experiencing Homelessness, 2005-2016

homelessness among displaced renters.

Emerging Issues

Employment growth and a growing interest in urban living are likely the principal drivers of housing demand growth in Cambridge. In particular, Cambridge's employment growth in sectors that employ high-earning professionals is shifting the dynamics of the housing market, as these professionals can pay more for the relatively static number of housing units. Understanding how this demographic change affects the housing market "on-the-ground" requires further study and action. Of particular concern is the growing housing insecurity faced by Cambridge residents, especially its renters in private housing not restricted as affordable to residents of low- and moderate- incomes. Forced moves (including those not accompanied by a formal eviction) are notoriously underrepresented in typical data.

Beyond this pressing concern, two other dynamics may deserve additional attention: the role of large higher education institutions in the housing market, and the expansion of the short-term rental market.

The growth of the university-affiliated population places an uncommon pressure on Cambridge's housing market. Students and university-affiliated residents generally have long been a part of Cambridge. However, as the student population has increased over the past 15 years, on-campus housing production did not fully keep pace with this growth. Cambridge's institutions added approximately 550 new undergraduate beds and 650 new graduate beds in that time. Of the roughly 11,500 undergraduate students living in Cambridge in 2016, 97% were housed in university dormitories or other university-affiliated housing.[46] In contrast, only 43% of the 11,160 graduate students living in Cambridge live in university-affiliated housing. The proportion of students living in Cambridge who live in university-affiliated housing grew for undergraduates between 2000 and 2016—up slightly from 96%. That proportion decreased for graduate students, down from 56%.[47] The population of graduate students living outside university-affiliated housing grew from 4,318 students to 7,703 students since 2000.[48]

Given their age, personal finances, and housing preferences, graduate students are largely similar to other housing consumers, and they often live with non-students. Nonetheless, further targeted study is necessary to determine what role, if any, large institutions must play in the housing market when growing their university-affiliated population.

Short-term rental housing for visitors and tourists is another emerging trend that may play a role in the broader housing market. In 2015, online short-term rental service AirBnB had 1,880 unique listings, the majority of which were full homes or apartments.[49] Full apartment listings were reserved on average 42 nights of the year, while private or shared rooms were reserved for 67 nights on average.[50] Harvard and Kendall squares had the highest density of AirBnB

46 Cambridge Town-Gown Reports Statistical Summary, 2015
47 Cambridge Town-Gown Reports Statistical Summary, 2000
48 Cambridge Town-Gown Reports Statistical Summary, 2000 and 2015
49 Information prepared by AirBnb for the City of Cambridge, September 2016
50 Ibid.

Cambridge Today Housing





Economy

Cambridge's economy includes a range of industries—from education to life sciences and technology to a vibrant retail and restaurant scene. As the economy has globalized and industrial jobs have declined in the US, the ability to nurture ideas is now central to the success of cities and regions. Cambridge is at the forefront of this new global economy of ideas, sometimes called the "knowledge economy." However, not all people in Cambridge share in the prosperity brought by this new economy. That prosperity is helping to draw new people to the area, and increased demand is driving up prices for housing, services, and more. Many residents, especially immigrant, youth, and lower income populations, lack financial security or the educational opportunities that enable upward mobility. The city's middle-income resident population in the city is shrinking. The challenge ahead lies in increasing economic mobility and expanding opportunity for all members of the Cambridge community, while continuing to foster the economic growth that helps the City maintain strong municipal services, fund schools, invest in infrastructure, and enable the community to thrive through economic cycles.

This section assesses Cambridge's economy on two broad viewpoints: (1) people living in Cambridge and (2) Cambridge as an employment center.

Learn more about . . .

"Income and Economic Security" on page 74

"Unemployment" on page 77

"Employment Mix" on page 80

"Job Growth" on page 85

"Wages and Wage Growth" on page 85

"Cambridge's Key Industry Groups" on page 86

"Retail" on page 88

"Entrepreneurship" on page 90

"Demand for commercial real estate" on page 91

"Policy Context: Economic Development" on page 78

Cambridge Today Economy

Cambridge Residents and the Economy

Cambridge's economy is fundamentally regional, national, and global. Nonetheless, the impacts of this economy are first felt locally. This section analyzes the economic circumstances of Cambridge residents.

Income and Economic Security

Incomes in Cambridge are higher than the national average but vary by race, ethnicity, and gender. Cambridge's median household income is $75,909, a figure which is greater than the median incomes of Boston and Somerville, but still tens of thousands less than Brookline or Newton.[1] The median income for households headed by non-Latino white residents is more than $50,000 greater than that of households headed by non-Latino black residents.[2] The median income for men is roughly 16% greater than that for women.[3] This difference holds even when controlling for educational attainment. Additionally, median incomes vary by geography. Though there are pockets of relatively high and relatively low incomes in all parts of the city, the western half of Cambridge generally has higher median incomes than the eastern half—roughly $88,000 vs. $71,000, respectively.[4]

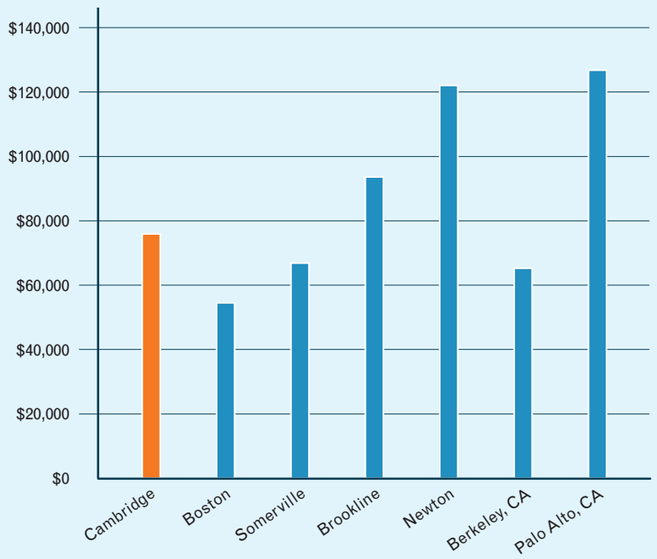
1 American Community Survey (ACS), 2010–2014 5-year estimates
2 Ibid.
3 Ibid.
4 Ibid.

Cambridge residents have high incomes compared to neighboring communities, but have not matched Palo Alto's income extremes.

Source: American Community Survey, 2010–2014 5-year estimates

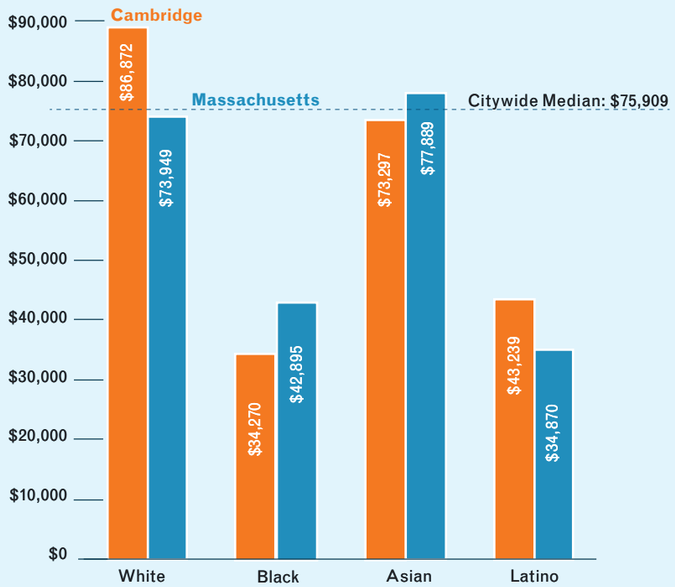
Berkeley and Palo Alto in California both have demographic and economic profiles similar to Cambridge, and are therefore useful comparisons.

Median Household Income by City



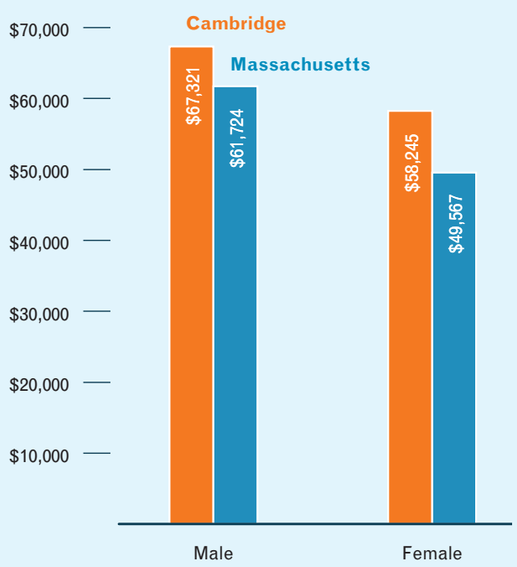
While income inequality between genders is less extreme in Cambridge compared to the commonwealth, Cambridge's income inequality by race and ethnicity is similar or more extreme.

Median Household Income by Race and Ethnicity



Source: American Community Survey, 2010–2014 5-year estimates

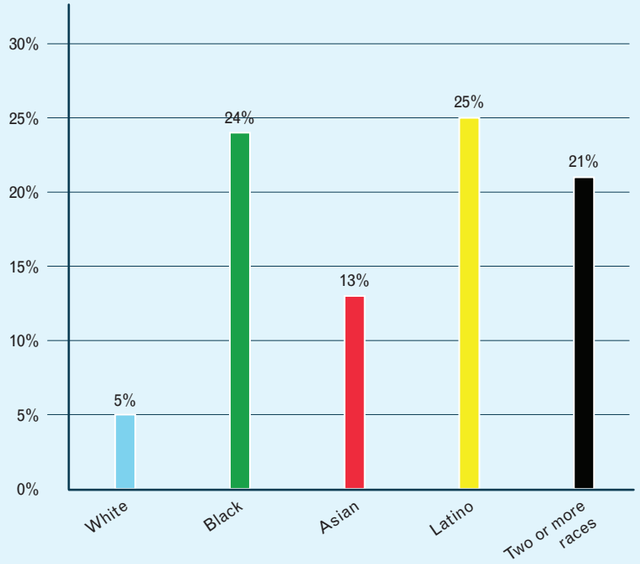
Median Annual Earnings by Gender



Source: American Community Survey, 2010–2014 5-year estimates

Non-Latino white households tend to have a higher net worth and have lower poverty rates than households of color.

Family Household Poverty by Race and Ethnicity

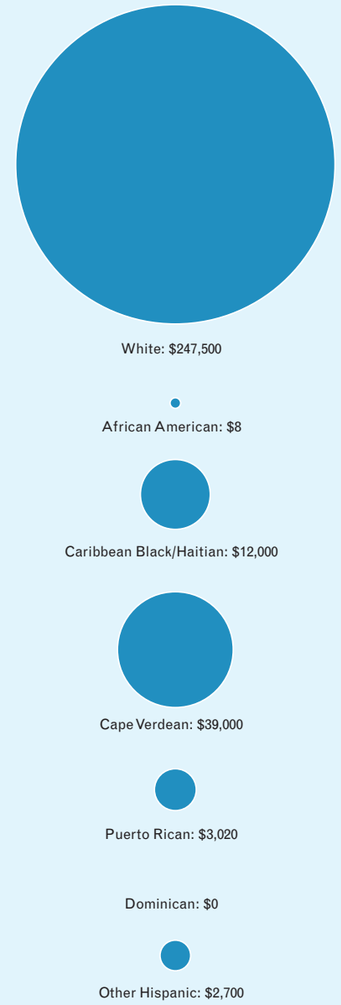


Source: American Community Survey, 2010–2014 5-year estimates

"There is a [part] of our population which is not engaged in the economic success of our city. Through internships, job training, mentoring we need to guide citizens to better jobs."

— Cambridge resident via online survey

Estimated Financial Disparities in Median Net Worth for the Boston Region



Source: Jeffrey P. Thompson and Gustavo A. Suarez. "Exploring the Racial Wealth Gap," Boston Federal Reserve, 2014. Data based on the Boston Metropolitan Statistical Area, a federally defined region surrounding Boston and Cambridge, stretching from southern New Hampshire to Plymouth County.

An estimated 15% of Cambridge residents earn less than the federal poverty threshold (roughly $24,000 for a family of four).[5] Single female-headed households make up more than half of the city's families living in poverty, despite representing only 20% of Cambridge's families.[6]

Single female-headed households make up more than half of the city's families living in poverty.

Poverty rates in Cambridge vary across race and ethnicity: roughly 26% of black residents and 26% of Latino residents live in poverty, while only 10% of non-Latino white residents live in poverty.[7] Only 5% of non-Latino white *families* are in poverty, while that rate is 24% and 25% for black and Latino families, respectively.

Furthermore, Cambridge's high cost of living makes the federal poverty line too low to accurately reflect all of the economic challenges faced by Cambridge residents. The City's Commission on Income Insecurity found a family of four would require almost $109,000 to be economically secure, and estimated roughly 54% of families of four are economically insecure.[8]

In addition to household income, wealth or "net worth" (a household's assets minus its debts) is another measure of economic prosperity. There is no wealth data specific to Cambridge, and the best information available is collected at the regional level. In the Boston region, the estimated median net worth of white households is almost $250,000, compared to only $8 for households headed by US-born black residents.[9]

Unemployment

In 2015, an estimated 2.2% of Cambridge residents were unemployed, compared to 5.0% of all commonwealth residents.[10] Cambridge's unemployment between 2001 and 2015 peaked in 2009 at 5.4%.[11] However, unemployment varies by race and ethnicity. For instance, between 2010 and 2014, an estimated 4.1% of non-Latino white residents were unemployed, while 13.5% of black residents were unemployed.[12] Compared to the commonwealth, unemployment was lower in Cambridge across races and ethnicities. While the unemployed population is not concentrated in any one neighborhood, unemployment can vary significantly by block.[13] Relatively high rates of unemployment can be found in some pockets of the Port, Wellington-Harrington, Riverside, Cambridgeport, and North Cambridge.[14]

5 ACS, 2010-2014 5-year estimates. This figure represents 13,656 people, or 15% of residents for whom poverty status was determined by the Census Bureau. The poverty status threshold varies by the number of people in each household. In 2014, a single person had to earn $11,670 or less to be considered impoverished. The threshold for households of four people was $23,850 in 2014.
6 Ibid.
7 Ibid. Note that the figure for black residents includes residents who identify as both black and Hispanic or Latino, while the Latino figure includes residents of any race who identify as Latino. Therefore there may be some overlap in these numbers.
8 City of Cambridge, Report of the Mayor's Blue Ribbon Commission on Income Insecurity in Cambridge, 2015. The Commission defines economic security as earning the amount of money needed for a person or persons to meet their basic needs without government assistance.
9 Muñoz, et al. for the Federal Reserve Bank of Boston. "The Color of Wealth in Boston," 2015
10 Massachusetts Executive Office of Labor and Workforce Development (LWD) labor market data, 2001–2015
11 ACS, 2010–2014 5-year estimates. Residents over 16 years of age are considered unemployed if they "(1) were neither 'at work' nor 'with a job but not at work' during" the week they were surveyed, "(2) were actively looking for work in the last 4 weeks, and (3) were available to start a job." The unemployed population also includes those who are not working while waiting to be called back from an employer that laid them off, as long as they are able to start work. These figures do not include those who are not participating in the labor force, such as students, retirees, or some parents.
12 Ibid.
13 Ibid.
14 Ibid.

Policy Context: Economic Development

The City of Cambridge carries out a number of economic and workforce development programs through the Community Development Department's Economic Development Division, the Department of Human Service Programs, and local partners. These programs aim to help demographically diverse entrepreneurs launch new businesses, increase patronage at local businesses, recruit new businesses to the city, and support residents in developing their skills and education. This list is a limited selection of the City's economic programs.

Helping Small Businesses

- The City's Economic Development Division offers over 20 business and entrepreneurship workshops annually. More than 250 people attended these workshops in Fiscal Year 2016.
- In Fiscal Year 2016, 14 businesses received $156,000 in reimbursement grants for facade, signage and lighting, or storefront accessibility improvements.
- The City assisted 24 businesses through the Small Business Enhancement Program and Retail Interior Accessibility Program in Fiscal Year 2016.
- In Fiscal Year 2016, the City provided technical assistance to develop programming in Cambridge commercial districts to 15 local business and neighborhood associations .
- In 2017, the City launched a granting program for well-designed projects that bring together neighborhood business interests around shared goals of improved design, promotion, and business resilience in a commercial area.
- Through the Cambridge Entrepreneurship Assistance Program, the City provides 5 low- and moderate-income, early-stage entrepreneurs with membership in the Capital Network, giving them access to fundraising workshops, panels, bootcamps, and office hours with experienced entrepreneurs and investors.

Workforce Development

- The Mayor's Summer Youth Employment Program and the Department of Human Service Programs' Recreation division employed more than 40% of Cambridge residents aged 14 to 17 in 2016.
- The City has enrolled 159 Cambridge residents with significant barriers to employment in the Cambridge Works program since 2008. This transitional jobs program provides participants with a paid internship and job-readiness skills training.
- Cambridge supported 11 Cambridge residents living in low- and moderate-income areas to enroll in local nonprofit Just-A-Start's Biomedical Careers Training certificate program. Enrollees receive academic and lab instruction to prepare them for entry level jobs in life sciences, research institutions, laboratories and hospitals.
- The Cambridge Employment Program (CEP) offers free job search assistance to adults. CEP can help with resumes, cover letters and interviewing skills, as well as using online job search tools and creating realistic career plans. In Fiscal Year 2016, CEP made 99 job placements.
- The Community Learning Center (CLC) provides free education and career counseling, tutoring, and basic computer instruction. These classes include Home Health Aid and Certified Nursing Assistant instruction. Nearly 900 students attend CLC classes each year.



Cambridge as an Employment Center

Cambridge is a jobs center, with more people working in the city than residents (116,089 workers vs. 110,402 residents). Approximately 12% of jobs in Cambridge are held by residents.* The remainder leave the city each day for work, and residents from other cities and towns commute to Cambridge each day.

Employment Mix

More than half the jobs in Cambridge are in education and in businesses that offer professional or technical services (like legal and accounting services, scientific research, business consulting, or computer systems design).[15] No other sector employs more than 10% of Cambridge workers.[16] Since 2000, employment in business management and in arts and entertainment has rapidly grown in Cambridge.

Meanwhile, employment in industries that typically offer middle-income wages—such as construction, manufacturing, and information (publishing and media)—has decreased over that time.[17] Importantly, Cambridge's employment mix deviates substantially from that of the nation. Industries like education and professional and technical services play a relatively large role in Cambridge's economy, when compared to the role they play nationwide.[18]

The proportion of education jobs in Cambridge is more than two times greater than in the nation as a whole, and employment in professional and technical services is 4 times more prevalent in Cambridge than in the nation. *(See "Employment Growth, 2001–2015; Location Quotient; and Sector Size" on page 82 for more comparisons between the Cambridge and US employment mix.)*

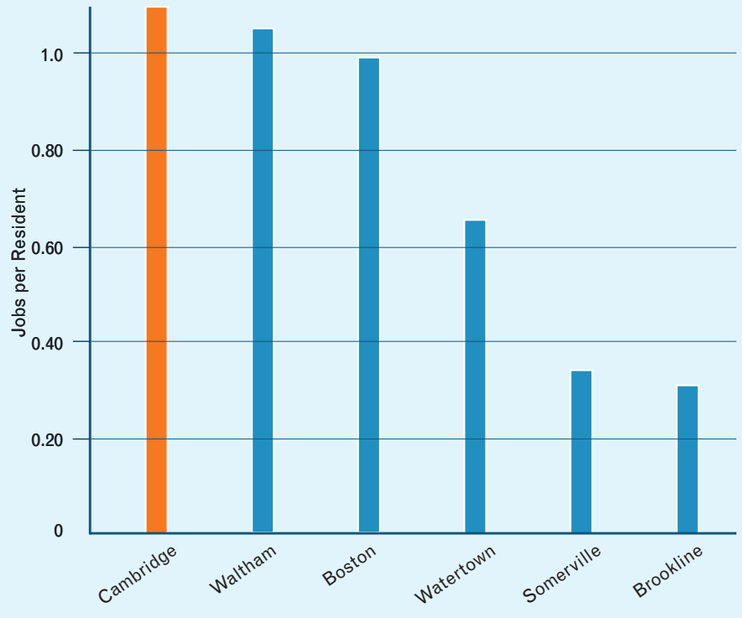
Cambridge's jobs in the life sciences comprise more than 57% of the jobs in professional and technical services. The proportion of those life sciences jobs in Cambridge is more than 18 times greater than that of the national economy. *(See "Cambridge's Key Industry Groups" on page 86 for more information on the life sciences industry.)* Most other jobs, especially in low- and middle-wage industries like retail or manufacturing, play less of a role in the city's employment mix than they do in the national economy.

The proportion of life sciences jobs in Cambridge is more than 18 times greater than that of the national economy.

* Census Bureau LEHD, 2016

15 MA Executive Office of Labor and Workforce Development (LWD), 2015. Employment data such as this report jobs by economic "sectors," which are federally-standardized groupings of employers by each employer's industry.
16 LWD, 2015.
17 Ibid.
18 Ibid. Here again this data refers to federally-standardized economic sectors. This paragraph specifically discusses "location quotients"—that is, the proportion of one sector's jobs in the overall mix of jobs in Cambridge divided by that same proportion for the United States.

Jobs Per Resident, 2015

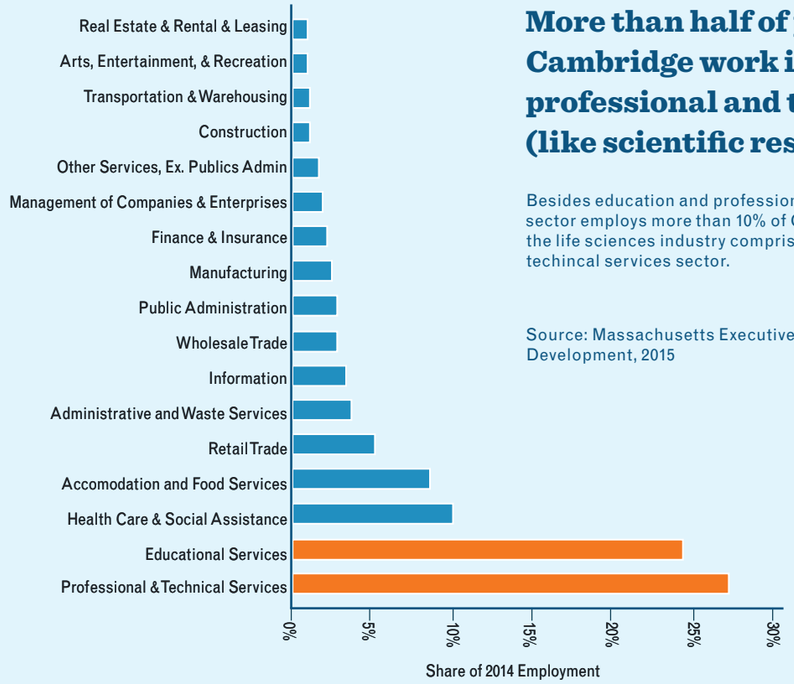


More people work in Cambridge than live in the city.

The city plays a critical role in regional employment, and residents benefit from Cambridge's economic centrality through high commercial tax revenues and daytime demand for local businesses.

Source: Massachusetts Executive Office of Labor and Workforce Development, 2015; Census Bureau Annual Population Estimates, 2015

Employment Share by Sector, 2015



More than half of people working in Cambridge work in education and professional and technical services (like scientific research).

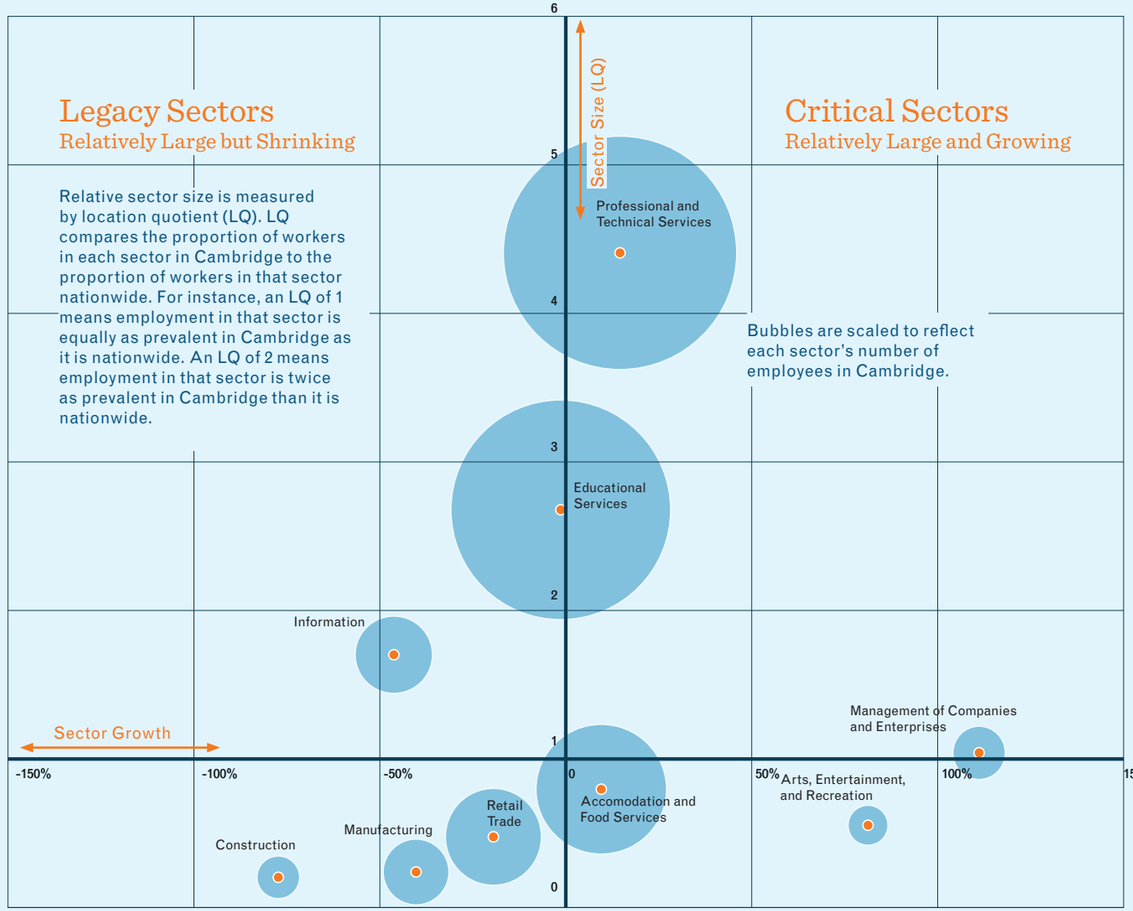
Besides education and professional and technical services, no other sector employs more than 10% of Cambridge workers. Furthermore, the life sciences industry comprises 57% of the professional and techincal services sector.

Source: Massachusetts Executive Office of Labor and Workforce Development, 2015

Sectors like education and professional services are critical to Cambridge's economy—especially the life sciences industry, which comprises over 57% of professional services.

Other sectors like arts and entertainment and food service have grown since 2001, but are an overall smaller proportion of the jobs in Cambridge.

Employment Growth, 2001–2015; Location Quotient, 2014; and Sector Size, 2015

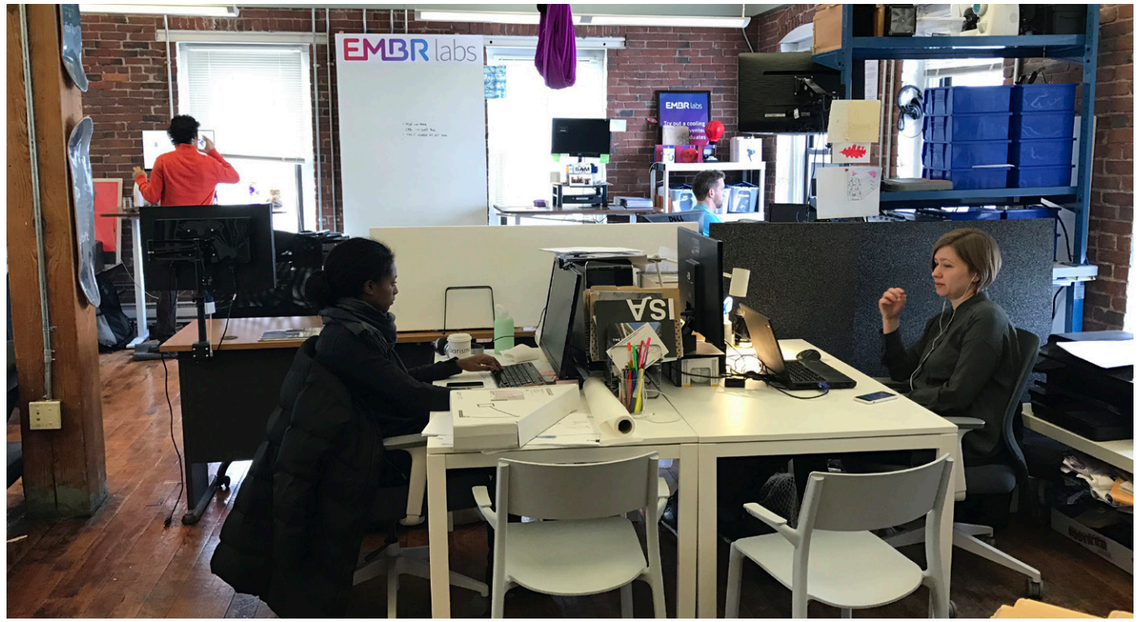


Source: Massachusetts Executive Office of Labor and Workforce Development, 2001–2015; Bureau of Labor Statistics, 2014. "Sectors" are classifications of employers created by the federal government—based (in most cases) on the goods or services that employer provides. Some sectors were left off the graph for clarity. These sectors generally saw minimal growth and had location quotients near 1. Sector growth is measured by the growth in the number of employees. For legibility and clarity, not all sectors are shown.



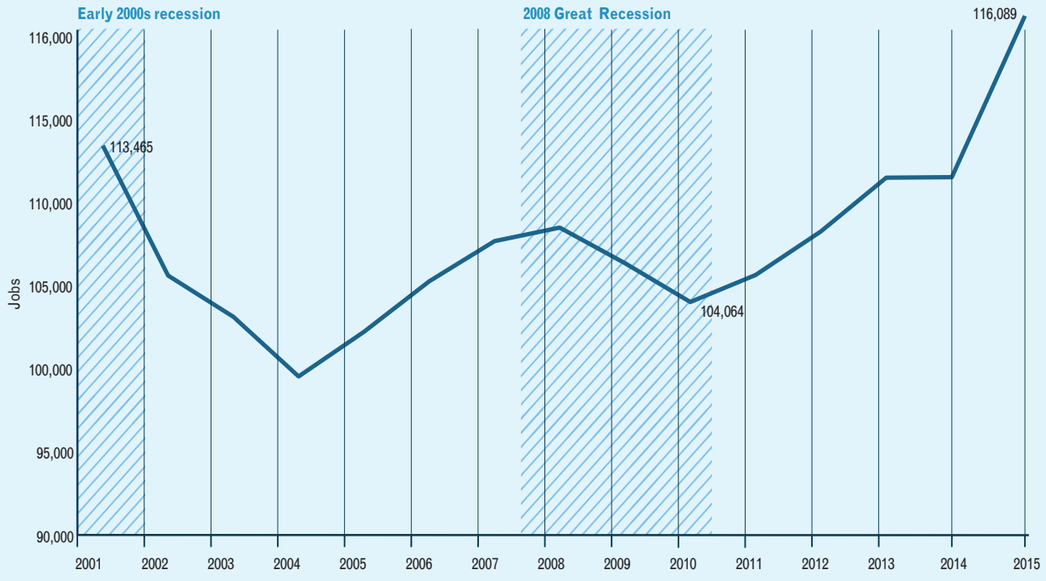
The growth of life sciences in Cambridge insulated the city's overall economy from much of the Great Recession.

Coworking spaces, like Industry Lab on Hampshire Street, nurture start-ups and small businesses. Cambridge currently has 19 of these spaces.



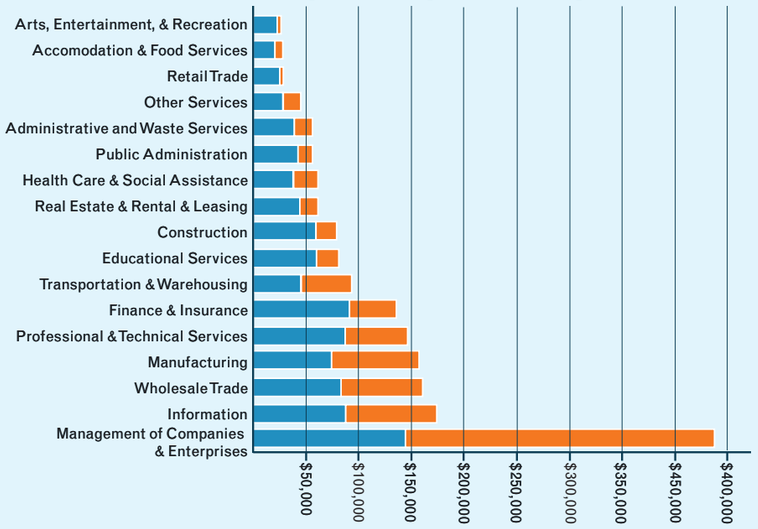
Employment in Cambridge dropped more in the early 2000s recession than in the 2008 Great Recession.

Number of employees in Cambridge, 2001–2015



Source: Massachusetts Executive Office of Labor and Workforce Development, 2001–2015

Change in Average Annual Wage, 2001–2014



Cambridge workers in high-paying industries, like management, saw their wages grow much faster in recent years than workers in lower-paying industries.

- Average wage in 2001 for a job in this sector in Cambridge
- Change in wage between 2001 and 2014, for a job in this sector in Cambridge

Source: Massachusetts Executive Office of Labor and Workforce Development, 2001–2014; US Bureau of Labor Statistics, 2001–2014

Job Growth

The number of Cambridge workers on employer payrolls has swung dramatically since 2000.[19] Cambridge's economy lost 14% of employees in the early 2000s recession and its aftermath.[20] Following a recovery in employment, Cambridge again lost jobs in the Great Recession, though not as many as in the early 2000s recession.[21] In 2015, Cambridge surpassed its 2001 peak in the number of payroll employees.[22] Since 2010, Cambridge has experienced employment growth rates similar to those of Boston, the commonwealth, and the US as a whole.[23]

Workers in Cambridge earn on average $10,000 more than the city's residents.

Wages and Wage Growth

Average wages for employees working in Cambridge have grown faster and to higher levels than in any surrounding community between 2001 and 2014.[24] Average wages now exceed wages for workers in Boston, and are more than twice the wages paid in Somerville.[25] However, both wage levels and wage growth are uneven across sectors in Cambridge. Furthermore, average wages for people who work in Cambridge are more than $10,000 greater than average earnings for people who live in Cambridge.[26]

Overall, wages for Cambridge workers in higher-paying industries (such as management of companies) increased faster since 2001 than wages in industries paying less (such as retail or food service).[27]

19 LWD, 2001–2015. "Payroll employees" are the most common and most rigorously tracked workers in the economy. The employment numbers fail to account for other participants in the economy, who may be growing in number. These other workers include the self-employed, business owners, freelancers, and contractors.
20 Ibid.
21 Ibid.
22 Ibid.
23 LWD, 2010–2015, Bureau of Labor Statistics, 2010–2015
24 Ibid.
25 Ibid.
26 LWD, 2001–2015, American Community Survey, 2010–2014 5-year estimates. Mean wages are the average weekly pay for Cambridge workers multiplied by 50. Mean earnings refer to income specifically from work (not investment income), and it is only calculated for residents who work full-time and year-round
27 LWD, 2001–2015

Cambridge's Key Industry Groups

These groups of industries play an important role in the city's economy, representing the largest contributors to the "Critical Sectors" and "Legacy Sectors" shown in "Employment Growth, Location Quotient, and Sector Size" on page 82. Employment in each of these industries is high in Cambridge, relative to the proportional role they play in national employment. As these industries' importance in the global economy has grown, Cambridge has prospered. There is some risk that without more economic diversification, an overreliance on a few industries could leave Cambridge vulnerable to economic disruption, but overall these industries have kept Cambridge's economy strong.



Life Sciences

Employment in life sciences, a group of industries that includes scientific research and pharmaceuticals, has been a relatively stable source of growth in Cambridge. Employment in the city's life sciences industry grew by 54% from 2001 to 2014, compared to 29% in Massachusetts and only 8% in the US as a whole. Life science firms have added roughly 6,000 jobs in the city since 2001. The life sciences industry was key to Cambridge's economic recovery from 2005 to 2008, and buffered the city during the Great Recession.

Today, life sciences' share of employment in Cambridge is 18 times greater than the share of life science workers in the national workforce. However, growth in life sciences employment has slowed since 2010, with life science jobs accounting for only about 10% of Cambridge's total job growth since 2010.

Life sciences jobs represent over 57% of Cambridge's employment in professional and technical services, a critical sector that also includes statisticians, computer systems analysts, lawyers, and architects. That larger sector is projected to grow by over 4,000 workers between 2014 and 2030.

From 2001 to 2014, employment in the life sciences in Cambridge grew 54%.



High Tech

Employment in high tech, a group of industries that includes software publishers and computer systems design, has been volatile in Cambridge. The Boston region was a mid-twentieth century leader in high tech with the growth of firms along the Route 128 corridor. Recent growth in tech has been concentrated in the urban core of the Boston region and in Cambridge in particular—though San Francisco, Silicon Valley, and New York City still dominate in the tech industry.

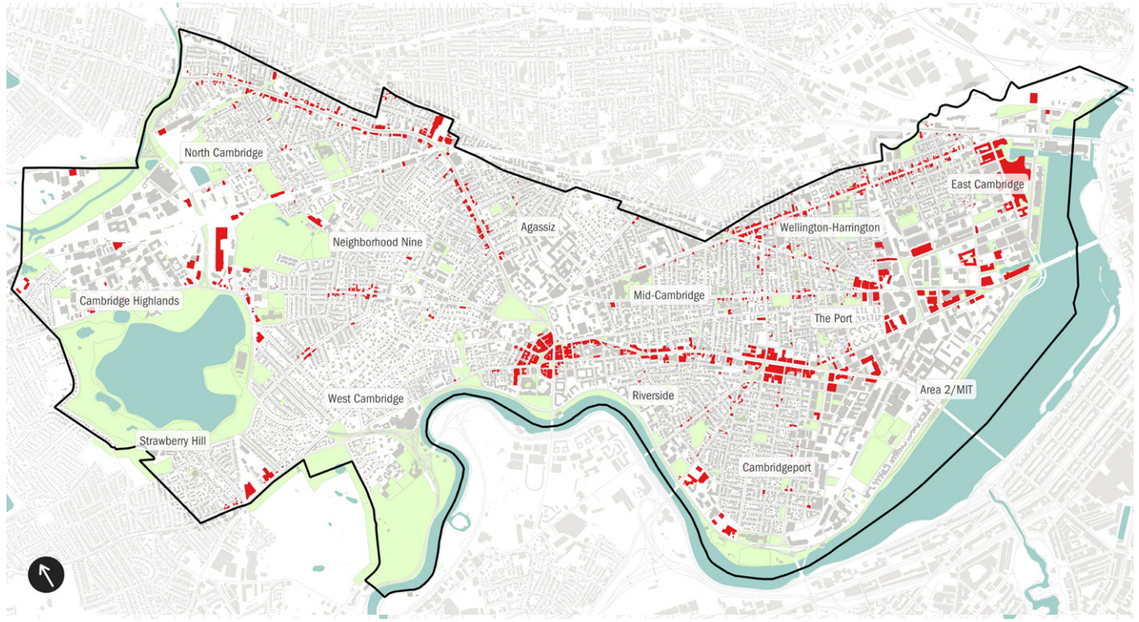
Cambridge experienced significant technology job losses in the early 2000s recession. However, technology employment recovered to 82% of its 2001 employment levels by 2014. Today, high tech has a relatively large presence in Cambridge's economy compared to that of the nation. High-tech jobs have become an increasingly important component of Cambridge's employment growth, accounting for 42% of the city's total job growth since 2010.

Education

Educational institutions, particularly MIT and Harvard, employ more people in Cambridge than any other industry and have done so for a long time. Of all Cambridge workers, 24% are employed in education. Although other important Cambridge industries have been vulnerable to shifts in the world economy and its boom-and-bust dynamics, education has proven to be the city's steady foundation. Employment at Harvard, MIT, and Lesley University, for instance, did not waver significantly during either the early 2000s recession or the Great Recession. Between 2001 and 2015, employment in education decreased slightly, technically making educational services a "legacy" sector, though that designation obscures the overall steadiness of employment in education.

The economic impact of these institutions goes beyond their direct employees. New businesses start up in Cambridge or move to the city in order to benefit from the human talent and big ideas that the city's schools attract. Additionally, consumer spending from students and faculty help support commercial districts across the city. Education employment is expected to grow by another 2,600 jobs between 2014 and 2030.





Retail Locations in Cambridge

Source: City of Cambridge land use data, Envision Cambridge analysis. Each red building sits on a parcel containing at least one retail space. These are defined by land use codes representing multiuse buildings, shopping centers, supermarkets, retail stores, eating establishments, retail condos, auto sales, auto repair, gas stations, and car washes. Envision Cambridge's analysis further added buildings known to have retail space and not otherwise designated as such.

Other Industries: Retail

Retail is an important component of the lived experience of Cambridge's economy for residents, workers, students, and visitors.[28] Retail and related consumer activity has traditionally clustered along the city's retail corridors, such as Massachusetts Avenue and Cambridge Street, and in accessible mixed-use districts like Harvard, Central, and Porter squares. Cambridge is also home to shopping centers like the Cambridgeside Galleria; emerging mixed-used districts like Kendall Square, Lechmere, and Alewife; and pockets of neighborhood business clusters like Huron Village and Observatory Hill.

Cambridge's retailers face a number of challenges. Nationally, retailers everywhere are compelled to offer more experience-based goods and services, employ a greater variety of social media marketing tools, and operate all-channel business models—meaning goods and services can be easily found and obtained both online and off. These trends are felt locally. Cambridge residents, on average, make more online purchases than the national average and have more access to internet services than the national average. Restaurants compose the largest retail category citywide (38% of retail businesses), and from 2001 to 2015 sales improved in experience-based categories such as food and beverage, services, and entertainment retail.

Stiff competition for space creates additional hurdles for local, independent retailers. While many national retailers have closed an unprecedented number of stores in early 2017 (over 3,200), some national retailers like Target and Amazon are opening smaller-sized stores in urban areas. Consumers can pick up their online purchases at these locations—enjoying the all-channel model of merged online and offline shopping. Beyond local competition, retailers in Cambridge face intensified competition from nearby regional retail centers like Downtown Crossing in Boston and Assembly Row in Somerville.

Lastly, Cambridge retailers face very different market conditions depending on their location. Foot and auto traffic, as well as the density and diversity of nearby uses, impact the viability of certain retail sectors. Because market conditions are not uniform across the city, some districts are more community-oriented while others are more regionally-oriented. Community districts support retailers whose customer base tends to be drawn from the immediate neighborhood while regional districts support more destination retail that customers make an effort to visit. The ratio of residents to workers in each of these districts plays an important role in determining orientation, as does access to many modes of transportation.

28 This section reflects the insights gained through the Cambridge Retail Strategy Plan, 2017



Retail businesses at Harvard Square help define Cambridge as a unique destination while serving the everyday needs of residents, workers, and students.

"I love the easy access to retail, restaurants, and quirky small businesses on the east side."

— Mid-Cambridge resident

Entrepreneurship

Cambridge's highly educated, university-affiliated population makes the city fertile ground for innovative business ideas, and its strong economy supports new service businesses that cater to its high-income population. However, little data exists at the local level to track entrepreneurial activity. The data that does exist—on new establishments, on coworking spaces, and on venture funding at the regional scale—points to a potentially strong entrepreneurial scene.

Between 2001 and 2014, the number of business establishments in Cambridge grew by 19%, with a net addition of 775 new establishments.[29] Of new establishments since 2010, 18% are high tech firms new to Cambridge. Only some of these new establishments are new businesses, however, as the figure includes new locations of existing businesses.

Between 2001 and 2014, the number of business establishments in Cambridge grew 19%.

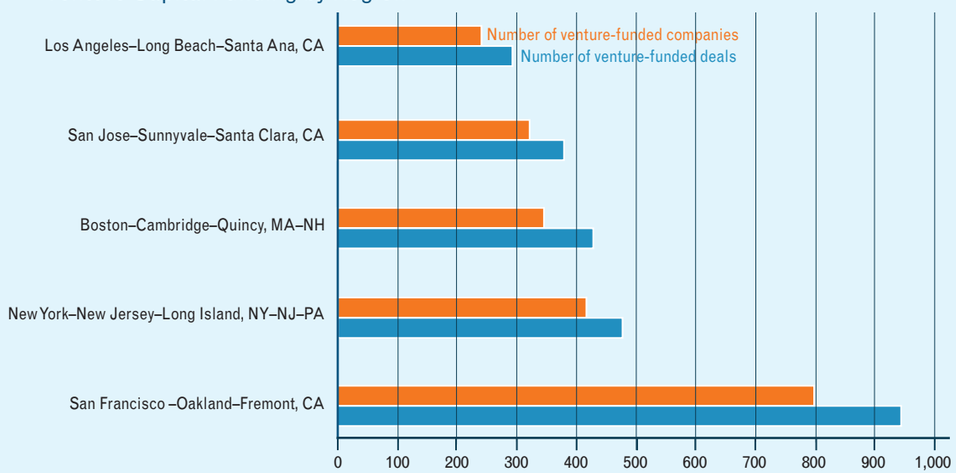
The emergence of coworking spaces, where individuals or small teams rent desk and meeting space in an open environment, is perhaps another proxy for entrepreneurship. At least 19 such spaces that market themselves to entrepreneurs (such as Cambridge Innovation Center, Workbar, and NGIN Workplace) have opened in Cambridge in recent years, and more coworking spaces are set to open soon.

Nationally, the Boston metro region also ranked third in the number of venture capital deals and the number of venture funded companies.[30] The region ranks fourth in amount of venture capital invested.[31]

29 LWD, 2001–2014
30 National Venture Capital Association, Rankings by Metropolitan Statistical Area, 2015.
31 Ibid.

The Boston metro region ranked third in number of venture capital deals and number of venture funded companies and fourth in amount of venture capital invested.

Venture Capital Funding by Region



Source: National Venture Capital Association, 2015

Demand for Commercial Real Estate

Cambridge's economic growth has driven strong demand for commercial (office and laboratory) space, as evidenced by high rents and low vacancy rates. During the early 2000s recession, vacancies left by badly hit or failing high tech firms depressed commercial rents in Cambridge.[32] By comparison, rents decreased only modestly during the Great Recession, due to Cambridge's strong life sciences sector.[33] Since 2010, rents for the most desirable ("Class A") commercial space increased 47%, and rents for less desirable ("Class B/C") office space increased 44%.[34] This rise reflects both continued demand from life science tenants and increasing demand from technology tenants. These tenants are willing to pay a premium to locate in Cambridge, due to the value they derive from access to talent, research pipelines, venture capital, and specialized suppliers. Rents are highest in and around Kendall Square, which has become the center of the knowledge economy and has seen an influx of international life science and technology tenants. Kendall Square leads all Cambridge and Boston submarkets in rents for commercial space.[35]

High demand—combined with physical capacity in former industrial districts—has enabled recent significant commercial development in Cambridge. From 2001 to 2015, Cambridge added net 6.6 million square feet of commercial space.[36] Since 2006, 86% of net new commercial space in Cambridge has been laboratory space, and Cambridge is now one of the largest markets for labs in the world.[37] Development in Cambridge has steadily converted industrial districts to residential and office/laboratory uses. Cambridge's inventory of industrial space decreased by 39%—a loss of 1.2 million square feet.[38]

Since 2000, most of the large commercial developments have occurred around Kendall Square, in the area between Massachusetts Avenue and Main Street known as the Osbourne Triangle, and in the former Cambridgeport industrial district.

High commercial rents invite more commercial development, but high rents also challenge the viability of established neighborhood businesses, Cambridge's traditionally strong nonprofit sector, and nascent startups (including those in booming industries).

32 Costar, 2001–2015
33 Ibid.
34 Ibid. "Commercial space" includes traditional office, flex, and lab/R&D space.
35 Lincoln Property Company, 2016Q2
36 Costar, 2001–2015
37 Jones Lang LaSalle, 2017
38 Costar, 2001–2015



Mobility

The majority of commute trips by Cambridge residents and the majority of trips through Cambridge's dense commercial corridors are made by walking, cycling, or public transportation. The City of Cambridge encourages the use of these sustainable and active modes of transportation through its policies and programs. Cambridge's diversity of convenient mobility options directly impacts economic opportunity for residents, the viability of its businesses, residents' physical health and wellbeing, cumulative greenhouse gas emissions, and more. Nonetheless, Cambridge must still address issues of regional traffic, high transit demand, the pressures of a growing population and workforce, and emerging technologies in transportation infrastructure. Furthermore, the City must work to ensure the fundamental safety and accessibility of all transportation modes to diverse users.

Learn more about . . .

"Changing Modes of Travel" on page 94

"Bicycling" on page 98

"Walking" on page 99

"Safety" on page 101

"Changing Infrastructure" on page 102

"Public Transit" on page 104

"Auto Traffic and Regional Concerns" on page 108

"Alternative Mobility Options" on page 111

"Policy Context: Mobility" on page 95

Cambridge Today Mobility

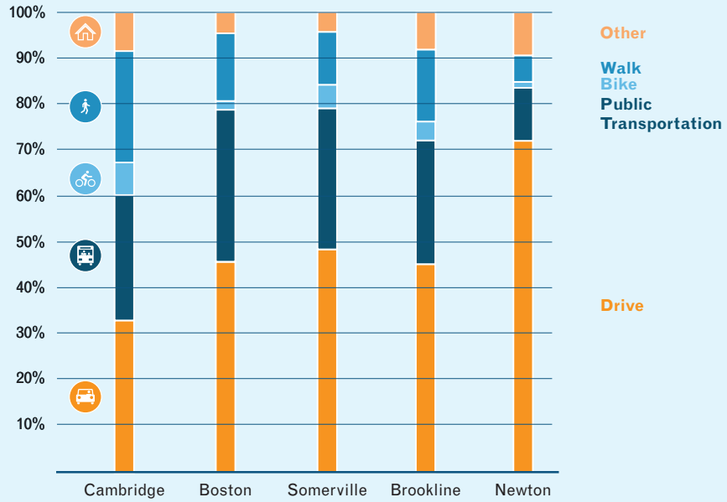
Changing Modes of Travel

Cambridge is a compact and walkable city, owing in part to its intact historic urban form. Beginning in the 1990s, the City began implementing policies to reduce reliance on driving and to make active and sustainable transportation choices more convenient and safe for people of all ages. *(See "Policy Context: Mobility" on page 95 for more information on recent city policies.)* Partly due to these efforts, trips by Cambridge residents to work, which are the most consistently tracked trips, trended away from automobile use and toward sustainable transportation over the last decade.[1] Today, Cambridge has rates of commuting by walking, cycling, and public transit that are among the highest in the nation. More than 30% of Cambridge residents walk or cycle to work, while an additional 27% use public transit.[2] Only 33% of Cantabrigians drive to work (including those driving alone and with others), though these rates vary from as low as 7% for those around Harvard to as high as 70% in Cambridge Highlands.[3] Rates of nonautomobile commuting are highest in areas adjacent to MBTA stops (with the exception of Alewife), and near job centers and large institutions. In general, there are more nonautomobile commuters in the city's relatively dense eastern neighborhoods than in the less dense western neighborhoods.

1 American Community Survey (ACS), 2010–2014 5-year estimates.
2 Ibid. Only about 20% of all trips are to or from work, hence commuting statistics tell only a narrow slice of the mobility story. However, commutes are the most rigorously and consistently surveyed trips.
3 Ibid.

Compared to its neighbors, Cambridge residents' preference for sustainable transportation when commuting is relatively high.

Percent of Residents by Choice of Transportation to Work, 2014



Source: American Community Survey, 2010–2014 5-year estimates Drivers include those in single-occupancy vehicles and those carpooling. "Other" includes those commuting by other modes (like taxis and mopeds), as well as those working from home.

More than 30% of Cambridge residents walk or cycle to work, while an additional 27% use public transit.

Policy Context: Mobility

Cambridge has adopted policies that guide mobility planning and implementation efforts. The policies look to create a city where people of all ages and abilities can get around comfortably and safely, primarily through active and sustainable modes of transportation: walking, bicycling, and public transit. This list is a limited selection of the City's mobility programs.

Codifying Sustainable Transportation

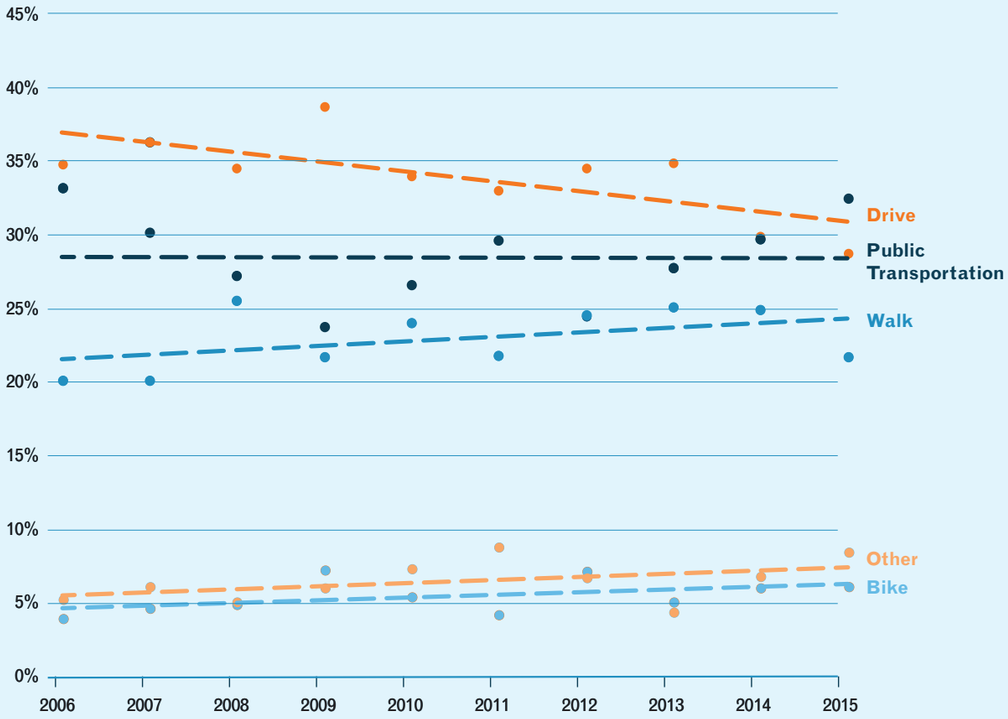
- The Parking and Transportation Demand Management Ordinance requires nonresidential property owners to take steps to curb single-occupancy vehicles and encourage people to walk, cycle, carpool, and take transit to their property. The ordinance is triggered when property owners propose new parking spaces.
- The Vehicle Trip Reduction Ordinance is a mobility omnibus bill that initiated or supported programs to reduce single-occupancy vehicle use, promote bicycle and pedestrian mobility, restrict visitor vehicle passes, set fees for residential parking permits, encourage local employment, and more.
- The Vision Zero Policy commits to eliminating transportation fatalities and serious injuries. The policy is both aspirational and sets a concrete target, and it connects Cambridge to like-minded cities through the national Vision Zero Network.
- The Complete Streets Policy mandates that all publicly funded transportation and street projects under the City's jurisdiction be safe and healthy for people of all ages and abilities, regardless of their transportation mode.

Encouraging Transportation Choice, Safety, and Accessibility

- The City has developed targeted plans to accomplish its sustainable transportation goals, such as the Bicycle Plan, Pedestrian Plan, and Transit Strategic Plan. These plans offer analyses and recommendations for diversifying mobility options and increasing safety and accessibility citywide.
- In Fiscal Year 2016, the City completed 10 projects to support the goals of the above plans, including bike rack installations and traffic calming measures. The City also constructed bus shelters at busy bus stops and in environmental justice areas, and it piloted the use of real-time transportation information screens at transit stops and City buildings.
- The City's 5-Year Plan for Sidewalk and Street Reconstruction further addresses quality and accessibility along discrete sections of sidewalk throughout the city, with special attention to meeting Americans with Disabilities Act requirements.
- The City's "Safe Routes to School" programs offer bicycle, pedestrian, and traffic safety education to students, in order to increase their physical activity, improve air quality around schools, ease traffic congestion, and grow a sustainable community. In Fiscal Year 2016, the City trained 287 students through these programs.
- The City provides door-to-door transportation for seniors and persons with disabilities to non-emergency medical appointments and weekly grocery trips, as well as taxi discount coupons for general use by those populations.

Cambridge residents' rate of commuting by car steadily decreased in the past decade, while rates of commuting by walking and cycling gradually increased.

Cambridge Residents' Commuting Rates by Transportation Mode, 2006–2015



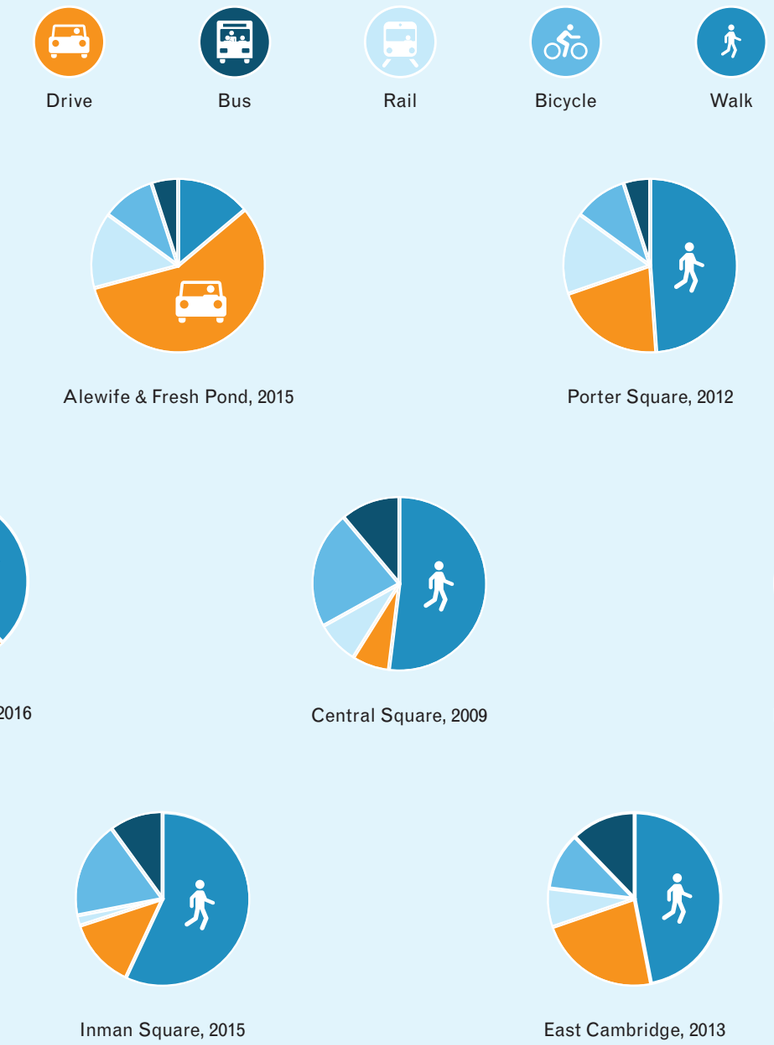
Points represent the rates for each mode each year. The dashed line represents the overall linear trend from 2006 to 2015. Drivers include those in single-occupancy vehicles and those carpooling. "Other" includes those commuting by other modes (like taxis and mopeds), as well as those working from home.

Source: American Community Survey, 2006–2015 1-year estimates

"I love the ability to walk, take the T / bus, or bike everywhere."

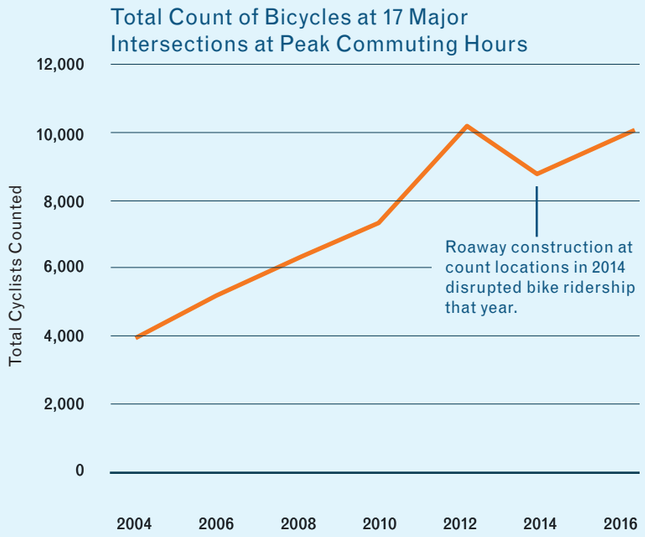
— Harvard Square resident

The importance of each mobility option varies by location in Cambridge. For instance, most of Alewife's visitors drive there, while the majority of Inman Square's visitors walk there.

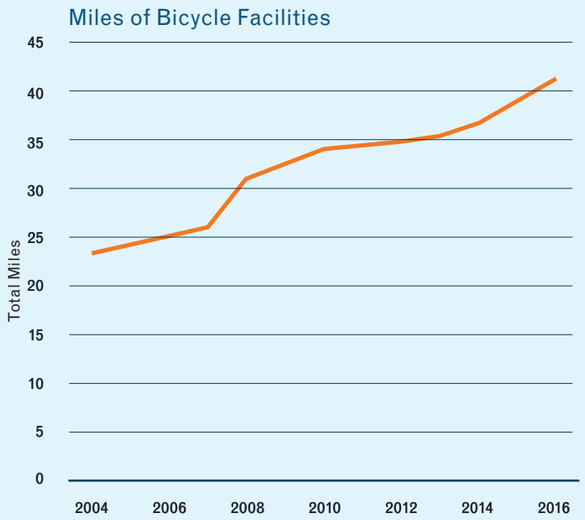


Source: Community Development Department, Customer Intercept Surveys, 2009–2016

Observed bicycle traffic increased as the City added on-street and protected bicycle facilities.



Source: Cambridge Bicycle Counts, 2004–2016. See note 4 in this chapter for count locations.



Source: Cambridge CDD. Bicycle facilities include bike lanes in the roadway, physically separated protected bicycle paths, and multiuse paths.

Bicycling

Overall, Cambridge is ranked as one of the top ten US cities for cycling.[4] Cambridge's biennial count of cyclists at 17 major intersections across the city shows that cycling more than tripled since the count began in 2002.[5] Meanwhile, bicycle commuting rates have increased dramatically since 2010, which coincides with the introduction of the Hubway bikeshare system and more bicycle infrastructure in nearby cities.[6] Roughly 7% of Cambridge residents commute by bicycle today.[7] Beyond just commutes to work, a 2011 survey of all trips in Cambridge showed travelers (including residents of Cambridge and nearby towns and cities) chose to bike for 6% of all trips (or portions of trips) occurring in Cambridge.[8] Intercept surveys of customers in Cambridge's commercial districts show bicycle ridership varies greatly by destination.[9] Cycling rates in those surveys ranged from 7% in Kendall Square to 22% in Central Square.[10]

In 2016, nearly 590,000 Hubway trips began or ended in Cambridge, representing 47% of all trips on the regional Hubway system that year.[11] Trips *both* beginning *and* ending in Cambridge represented 24% of all 2016 Hubway trips.[12] Hubway subscribers made 85% of those trips, demonstrating the system's importance for residents and workers—not just tourists or visitors.[13]

4 In 2016, Cambridge was ranked 8th nationally by *Bicycling* magazine, having increased its ranking from 10th in 2014.
5 Cambridge Bicycle Counts, 2002–2016. The count locations are Inman Square, Mass. Ave. at Memorial Dr., Mass. Ave. at Vassar St., Lafayette Square, Mass. Ave. at Linear Park, Porter Square, Broadway at Hampshire St., JFK St. at Memorial Dr., Brattle St. at Sparks and Craigie streets, Western Ave. at Memorial Dr., Brookline St. at Granite St., Quincy Square, Brattle St. at Mason St., Fresh Pond Parkway at Concord Ave., Arsenal Square, Huron, and River St. at Putnam St.
6 ACS, 2010–2015 1-year estimates
7 Ibid.
8 CitySmart Year Three: Final Report, 2011
9 CDD Customer Intercept Surveys, 2009–2016
10 Ibid.

Walking

Walking remains one of the most important mobility options in Cambridge. Nearly one in four Cambridge residents walk to work.[14] Walking for commute trips is particularly popular for residents near the city's universities and close to MBTA stations.[15] Walking is likely even more important for noncommute trips, though there is little data tracking the popularity of walking overall. Surveys of customers in Cambridge's squares and commercial corridors show the popularity of walking to these areas ranges from 14% of surveyed customers in Alewife to 57% of those surveyed in Inman Square.[16]

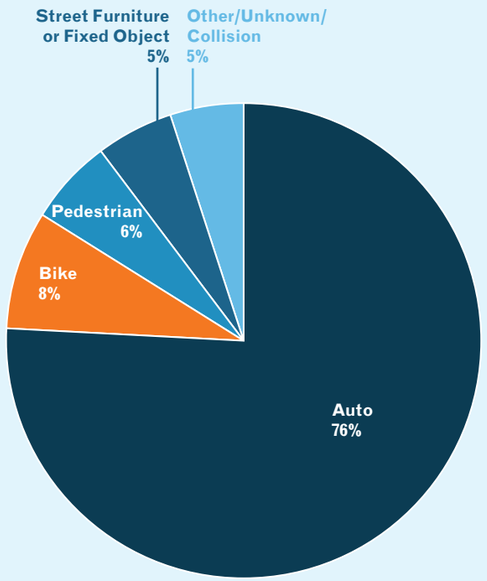
11 Hubway Open Data, 2017
12 Ibid.
13 Ibid.
14 ACS, 2015 1-year estimates
15 Ibid.
16 CDD Customer Intercept Surveys, 2009–2016



A Hubway station in Harvard Square. Source: Cambridge Office of Tourism

Nearly one in four Cambridge residents walk to work.

Automobile Crashes by What the driver Hit, 2015

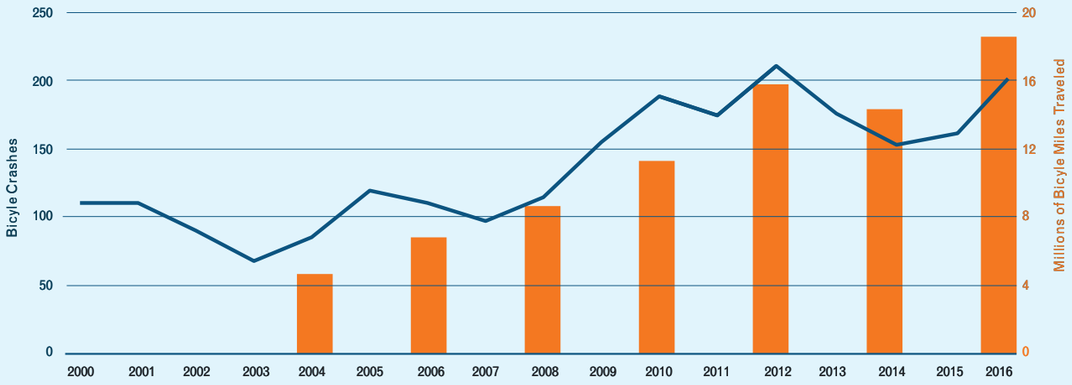


Of reported 2015 crashes resulting in harm, 76% exclusively involved automobiles hitting other automobiles.

Source: Cambridge Police Department Vehicle Crash Data, 2015. These figures exclude crashes where no harmful incident was noted, accounting for 57% of all reported crashes. Approximately 98% of the crashes used in the above analysis included at least one automobile; data on the remaining 2% of crashes do not specify a vehicle.

Bicycle miles traveled increased by more than 300%, but the number of reported bicycle crashes has not increased at the same pace, resulting in decreased bicycle crash rates.

Bicycle Miles Traveled vs. Bicycle Crashes, 2000–2016



Source: Cambridge Bicycle Crash Fact Sheet, 2012; Cambridge Vehicle Crash Data, 2010–2016; Cambridge Bicycle Plan, 2015; Cambridge Bicycle Ridership Survey; Envision Cambridge analysis. Bicycle miles traveled (BMT) is an estimate derived from the federal Vehicle Miles Traveled formula applied to local bicycle counts. BMT estimates are unavailable prior to 2002, and 2016 estimates are subject to change.

Safety

In 2015, 2,111 vehicle crashes were recorded in Cambridge.[17] This represents the highest number of crashes since 2010, and a significant increase over 2014 figures. While the number of vehicle crashes has increased nationwide due to distracted driving, Cambridge's increase occurred the first year after a significant change in the reporting and publishing of crash data, so the increase could also represent differences in methods.[18] Of all 2015 crashes where a "harmful event" was recorded, 76% were collisions exclusively between automobiles (either moving or parked), and 14% involved cyclists or pedestrians.[19] In 2015, 7% of all reported crashes resulted in an injury.

The *rate* of crashes involving cyclists has trended down since the mid-2000s, decreasing by approximately 30% since 2004.[20] The decrease in crashes is likely due to a number of factors, including more bicycle infrastructure and the "safety in numbers" effect. However, the total reported *number* of crashes involving cyclists has increased, and these crashes have caused both serious injuries and death.

From 2000 to 2010, bicycle crashes increased by 122%.[21] Since then, the number of crashes has increased and decreased without a clear trend, reaching a high of 215 crashes in 2012 and a low of 157 crashes in 2014.[22] Notably, less serious bicycle crashes tend to go unreported. Though these small crashes can deter people from continued cycling, overall cycling rates are increasing.

The ultimate impact of crashes cannot be measured by numbers or rates alone. Travelers using all modes have suffered critical injuries and even death as a result of crashes. Crashes caused the death of 2 cyclists and 1 pedestrian since 2016.

17 Cambridge Police Department Vehicle Crash data, 2015.
18 Cambridge Police Department Vehicle Crash data, 2010–2016. This data includes both "historical" and "updated" data, which overlap temporally. This analysis excludes all crashes from the historical dataset for 2015–2016, but includes data from 2010–2014 from the updated dataset.
19 Cambridge Police Department Vehicle Crash data, 2015.
20 Cambridge CDD, Bicycle Crash Types and Trends, 2014. The bicycle crash rate is an estimate derived from the number of reported bicycle crashes and the estimated Bicycle Miles Traveled (BMT) in Cambridge. BMT is estimated using observed bicycle counts and the federal formula for Vehicle Miles Traveled.
21 Cambridge Police Department Vehicle Crash data, 2010–2015; Cambridge CDD, Bicycle Crash Fact Sheet, 2012.
22 Cambridge Police Department Vehicle Crash data, 2010–2015.



Changing Infrastructure

The City of Cambridge works to make it easier and safer for travelers to choose to walk, bike, or take transit, in order to reduce the negative impact on health, air quality, noise, safety, climate change, and public open space caused by automobiles. These efforts include the reconstruction of sidewalks, a focus on protected bicycle facilities, the implementation of traffic calming, the provision of bus stop amenities, and more. Roadways and sidewalks are typically reconstructed in Cambridge either through the process of sewer separation, as a result of the City's 5-Year Roadway and Sidewalk Reconstruction Plan, or as part of development mitigation. *(See "Stormwater and Sewer" on page 126 for more information on sewer separation.)*

Between 2009 and 2012, the City constructed 220 new sidewalk ramps across the city.[23] As of 2016, most of city sidewalks score in the top two bands of Cambridge's sidewalk conditions assessment scale.[24] The majority of sidewalks with the worst ratings are currently undergoing reconstruction along the Concord Avenue and Huron Avenue Corridors, as part of a sewer separation project there.[25] Overall, the City prioritizes reconstruction near parks, squares, libraries, schools, youth and senior centers, elderly housing, along bus routes, and in areas identified by the Commission for Persons with Disabilities or in the Bicycle Network Vision Plan.

Traffic calming projects introduce physical and visual cues causing drivers to slow down. These projects can include reduced driving lane widths, curb extensions, raised intersections, and more. As of this writing, the City has completed dozens of traffic calming projects, 2 are under construction, and 9 are at some stage in the design and preconstruction process.[26]

For bicycles, the City has focused its recent efforts on construction of protected bicycle facilities, such as the new "cycle tracks" on Western Avenue, Binney Street, and Vassar Street. In the past year, the City also piloted temporary protected bicycle lanes along Massachusetts Avenue, Brattle Street, and Cambridge Street. In addition to protected bicycle facilities, the City seeks to increase network connectivity through dedicated bicycle lanes and shared streets, as well as infrastructure such as bicycle signals. The average roadway pavement condition improved slightly in 2016, and the city's roads generally have pavement in fair to good condition.[27] However, the number of roadways needing rehabilitation is increasing.[28]

Though the City does not control the MBTA, it can encourage transit use in the City by the provision of amenities at transit stops. These efforts include increasing space available to waiting riders, the addition of bus shelters or benches, and improved signage, including real-time transit information.

23 Cambridge DPW, Five Year Sidewalk and Street Reconstruction Plan, 2016.
24 Ibid. This scale rates sidewalk segments between 0 (excellent) and 35 (poor) along four criteria: driveway conditions, cross-slope, trees or other obstructions, and overall structural condition. The top two bands include sidewalks rated between 0 and 14.
25 Cambridge DPW, Construction Interactive Map, 2017
26 Cambridge CDD, 2017
27 Cambridge DPW, Fiscal Year 2017 Pavement Management Summary
28 Ibid.

> "I really want to come up with a strategy to transition our streets away from their devotion to cars! We will have a much more pleasant city if we develop people-centered livable streets, prioritizing safe bike and pedestrian access, and rapid bus transit."
>
> —North Cambridge resident



Workers reconstruct sidewalks along Western Avenue. The City implemented this street redesign to replace deteriorated sewer, drain, and water infrastructure; increase pedestrian and bicycle safety and comfort; improve bus amenities; and improve sidewalk management through additional green space and pervious pavement.

The Vassar Street cycle track separates bicycle, pedestrian, and automobile traffic so that all users feel more comfortable.



Public Transit

Cambridge resident's use of public transit (rail and buses) for commute trips grew from 25% to 32% between 2005 and 2015.[29] Furthermore, transit is one of the most popular transportation modes for people surveyed in Cambridge's squares and commercial districts.[30] Given projected demographic changes and the economic centrality of Cambridge in the region, the demand for public transit will likely grow. The City recently completed a Transit Strategic Plan, in response to Cambridge's changing needs. *(See "Policy Context: Mobility" on page 95 for more information on the City's transportation efforts.)*

The Red Line's estimated average weekday ridership in 2013 was approximately 272,300, and grew by 6% to 287,900 in 2016.[31] The Red Line's 2013 ridership included 217,300 entries directly into Red Line stations, 35% of which (75,200) occurred in Cambridge.[32] In contrast, a weekday average of 6,400 passengers entered the Green Line in Cambridge at Lechmere. Though there is excess Red Line capacity throughout much of the day, the line is currently reaching capacity at peak commute times.[33]

At Red Line stations in Cambridge, an average of 9% of passengers waited longer than expected, compared to 10% for all Red Line stations.[34] The most reliable stop was, predictably, the origin stop Alewife, where only 2% of passengers waited longer than expected.[35] In contrast, 12% of passengers boarding at Kendall and 11% in Central waited longer than expected.[36] The MBTA recently approved the purchase of all new Red Line traincars. The new fleet is expected to significantly improve capacity and reliability.

Cambridge is additionally served by the Green Line stop at Lechmere, and the Orange Line at Community College in Charlestown, a short distance from North Point. Fully 28% of passengers boarding at Lechmere waited longer than the scheduled time between trains.[37] The MBTA's Green Line Extension project will build two new branches north of Lechmere, one running to Union Square in Somerville and the other through Somerville to College Avenue in Medford. Construction is scheduled to be complete in 2021.

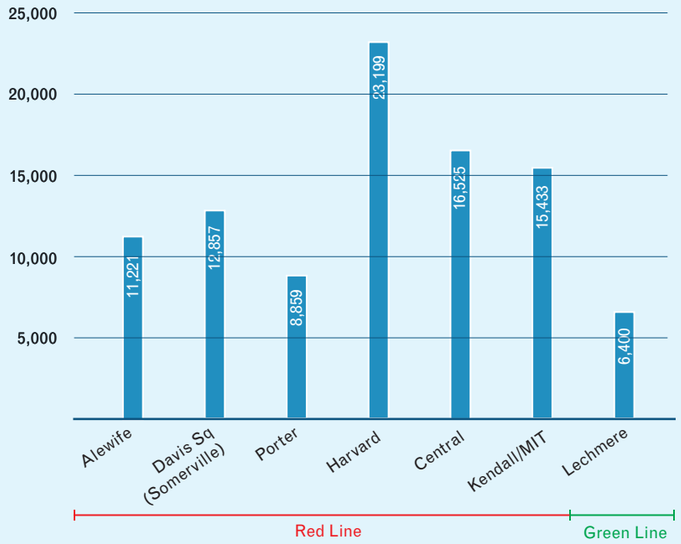
29 American Community Survey, 2005–2015 1-year estimates
30 Cambridge CDD, Customer Intercept Surveys, 2009–201
31 MBTA Ridership and Service Statistics (Blue Book), 2014; MBTA Dashboard Data, 2016
32 Ibid.
33 MBTA Dashboard Data, 2016
34 Ibid.
35 Ibid.
36 Ibid.
37 Ibid.



The MBTA's Red Line is one of the primary regional connections running through Cambridge.

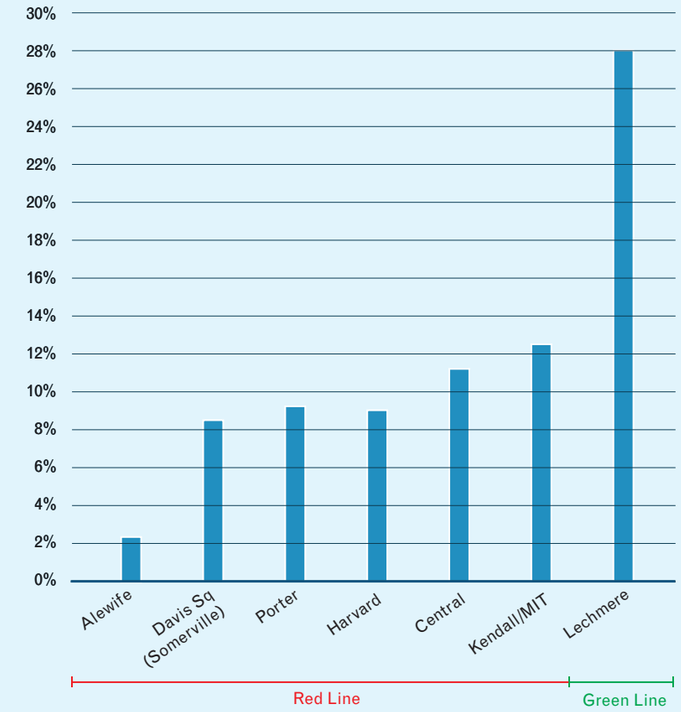
The MBTA is currently replacing its entire Red Line fleet with more than 250 new rail cars. The new fleet will be capable of decreasing the time between trains to 3 minutes during peak commute hours, increasing capacity by 10,000 passengers per hour.

Within Cambridge, the MBTA Red Line sees the most station entries at Harvard Square.



Average Weekday Station Entries, 2013

Source: MBTA Ridership and Service Statistics, 2014. While 2016 ridership data was released by MBTA, station-specific entry data was not. 2013 represents the latest data available for station entries.



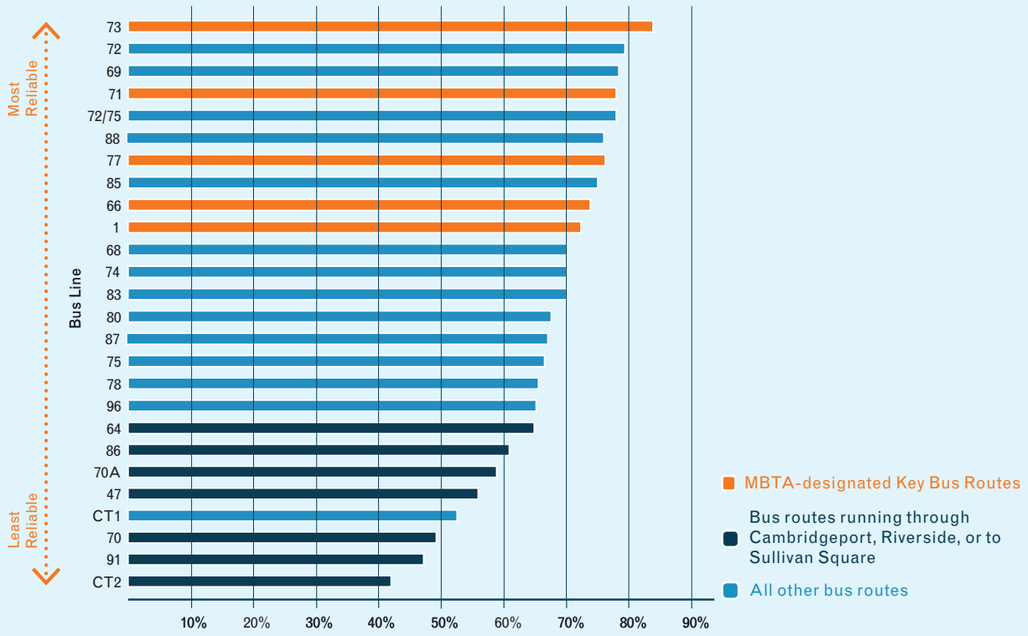
Percent of Passengers Waiting Longer than the Scheduled Interval between Trains, 2016

Source: MBTA Dashboard Data, 2016

Key bus routes through Cambridge are relatively on time compared to other routes running through the city.

Bus routes running through Cambridgeport and Riverside or crosstown to Sullivan Square are the least reliable.

Bus Route Reliability (Percent of Stops Made on Time), 2016



Source: MBTA Dashboard Data, 2016. See note 40 in this section for an explanation of bus reliability and how reliability is measured.

In 2013, average weekday bus ridership on routes that travel to, from, or through Cambridge totaled 86,600.[38] The 66 and 1 bus routes carried the most passengers on an average weekday—more than 13,000 passengers each, however these passengers did not necessarily all ride through Cambridge.[39]

Key MBTA bus and trackless trolley routes running through Cambridge (1, 66, 71, 73, and 77) were on time 77% of the time in 2016 on average.[40] All other bus routes were on time 64% of the time on average. The least reliable routes typically run through Cambridgeport and Riverside or to Sullivan Square.[41] These reliability figures demonstrate how well or how poorly the bus routes keep to their specified schedule. However, they do not speak to more fundamental questions of each bus route's efficacy as reliable transportation, measured by factors such as its hours of operation and how often it runs.

Transit is a critical feature for fostering economic opportunity and healthy, sustainable lifestyles. While many aspects of public transit are outside the City's direct authority, Cambridge plans to improve transit service through the aspects it directly controls—the streets, signals, and bus stops. Cambridge aims to mitigate increased bus travel times through dedicated bus priority treatments like signal priority and sections of exclusive bus lanes. Beyond these street-level changes, the City will continue to advocate for more convenient and reliable transit from the MBTA.

"I hope Cambridge will be more a people city and less a car city, where alternative transportation becomes even more attractive."

— Cambridgeport resident

38 MBTA Ridership and Service Statistics (Blue Book), 2014
39 Ibid.
40 MBTA Dashboard data, January 1–December 31, 2016. The "key bus route" designation is made by MBTA. Bus reliability data is not tracked by stop, only by route. The figures referenced here describe the reliability of bus routes that move through Cambridge, not the reliability of those routes at stops in Cambridge specifically. Bus reliability is tracked either by its adherence to the published schedule or by its maintaining expected intervals between buses, depending on the route.
41 The most reliable bus routes through Cambridge were the 69, 71, 72, 72/75, 73, 77, 85, and 88 – each of which was reliable 75% of the time or more in 2016. The least reliable routes – on time less than 65% of the time – were the 47, 70, 70A, 86, 91, CT1, and CT2. The 70A, 91, and CT2 were all on time less than half the time in 2016.



The 91 bus, which connects Central Square to Sullivan Square in Somerville, is one of the least reliable buses running through Cambridge.

Auto Traffic and Regional Concerns

Population and job growth in Cambridge and the region has been strong in recent decades, yet automobile traffic in Cambridge has not increased at a similar rate. These changes are due to changing mobility choices and social values, as well as effective City initiatives, such as Parking and Transportation Demand Management (PTDM).

The number of cars using major streets has stabilized and in some cases decreased. For instance, the estimated number of automobiles using Broadway in Kendall Square decreased by 7% between 1998 and 2013.[42] Estimated daily traffic was comparably lower across similar time periods on streets such as Prospect Street at Hampshire Street (9%), Massachusetts Avenue at Arrow Street (29%), and elsewhere.[43] Overall, the average daily traffic in 2010–2014 was 4% less than average daily traffic in 1995–1999, and 9% less than average traffic on the same streets in 2000–2004.[44]

The decrease in average daily traffic estimates coincides with the growth of City policies designed to decrease automobile use in Cambridge. These include the limits to new parking, significant investment in sustainable transportation infrastructure, and land use decisions that encourage walking, cycling, and public transit ridership. *(For more information, see "Policy Context: Mobility" on page 95.)* PTDM plays a significant role, as it sets limits for new trips created by development projects. The Ordinance requires all developments that add 5 or more new parking spaces to provide incentives for nonautomobile travel, and requires large projects to monitor how many people are driving to their development. These policies, coupled with demographic and economic trends unfavorable to automobile travel, help to account for the lack of growth in traffic.

Despite this, automobile traffic remains a persistent issue in areas of high growth, especially where regional traffic moves through Cambridge, particularly Alewife. The most recent traffic estimates along Alewife Brook Parkway north of Cambridgepark Drive show the estimated average daily traffic there increased 11% between 2013 and 2016.[45] This estimate demonstrates how regional transportation patterns can influence traffic in Cambridge despite local policy, as an estimated 82% of traffic through that corridor neither begins nor ends in Cambridge.[46] Nonetheless, estimated traffic on Alewife Brook Parkway remained relatively flat between 1999 and 2016.[47]

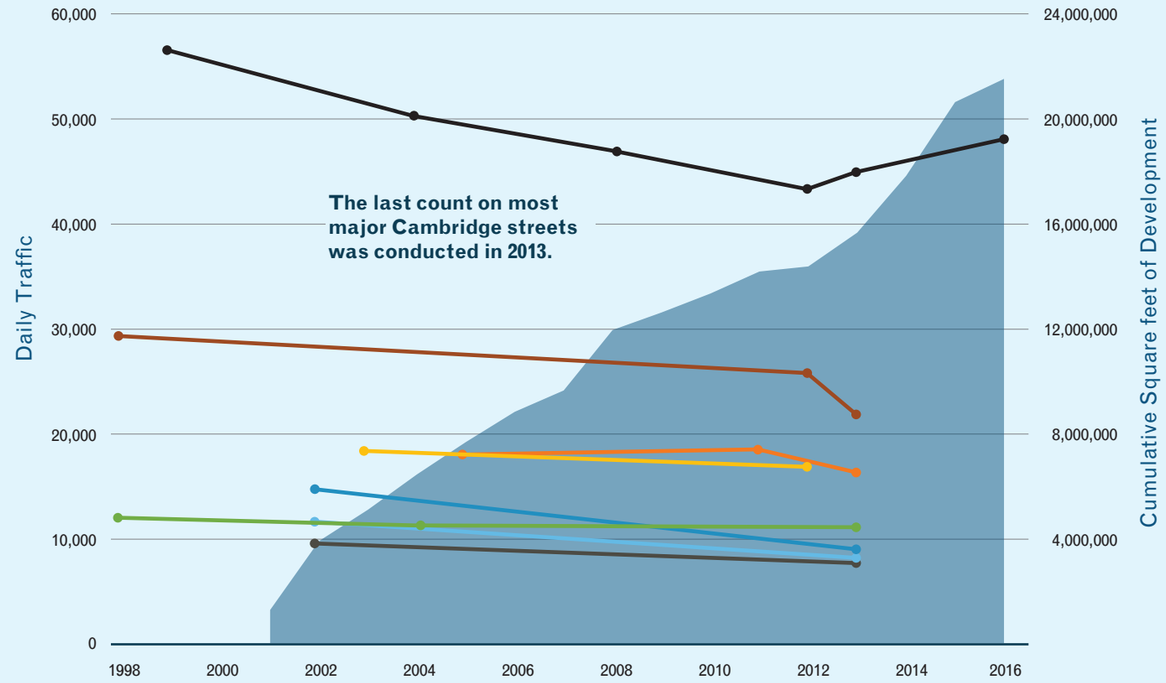
82% of the trips on Alewife Brook Parkway neither originate nor end in Cambridge.

The relative stability of traffic running through Alewife and other regional thoroughfares is a testament to the mobility trends and policy decisions working in Cambridge. Nonetheless, relative changes in traffic volume may have little impact on quality of life in neighborhoods near corridors with very high traffic volumes, such as Alewife. Decreasing regional automobile traffic and mitigating its impacts along these regional thoroughfares must involve broader engagement with neighboring municipalities, as well as the state agencies that often control these streets.

42 City of Cambridge, Average Daily Traffic Counts, 1998–2016. The last count on many major streets was conducted in 2013.
43 Ibid.
44 Ibid. These figures represent changes in traffic volumes on streets where traffic was measured between 2010 and 2014, as well as the comparison time period.
45 Ibid.
46 Interpreted from CTPS Regional Transportation Demand Model, 2012
47 City of Cambridge, Average Daily Traffic Counts, 1999–2016

Traffic volume has been fairly stable in recent years across most of Cambridge, despite significant development, and regional population and job growth. However, traffic volumes remain very high in some places, such as Alewife Brook Parkway.

Actual and Estimated Average Daily Traffic Counts, 1998–2016; Cumulative Square Feet of Development, 2001–2016



Source: Traffic: City of Cambridge, Average Daily Traffic Counts, 1998–2016. In all cases, data collection did not occur every year. These lines are drawn from the first observed count, through each additional observed count until the final observed count. Cumulative development: City of Cambridge Development Logs, 2001–2016. Development data only includes projects with 50,000 square feet of commercial space, 50 or more parking spaces, 8 or more housing units, or hotel beds.



The Charles River Transportation Management Association runs its EZRide Shuttle through Kendall Square, Area 2/MIT, and parts of Cambridgeport and East Cambridge.

"I hope Cambridge will have less traffic, pollution, [and] noise. It should be safe to cross the street and ride a bike. There should be additional public transportation, including nontraditional options."

— Alewife/Fresh Pond resident

Alternative Mobility Options

Numerous alternatives to public transit have also emerged and must be considered within the wider mobility system. These include nonprofit transportation management associations (TMAs), institutional transportation providers, for-profit mass transit businesses, and online ride-hailing services. TMAs provide various transportation services for consortia of businesses, institutions, and some large residential developments—including independent bus and shuttle services running between transportation hubs and TMA member locations.

The Charles River TMA operates the EZRide shuttle in East Cambridge, Kendall Square, and MIT, serving roughly 2,000–2,500 riders per day.[48] The City of Cambridge is a member of the Charles River TMA, and the public can board the EZRide shuttle for a fare. The Alewife TMA operates the Alewife shuttle, which largely connects the Alewife Quadrangle to the Alewife MBTA Red Line station.

A group of academic, medical, and other institutions also operates the Longwood Medical Area shuttle, which has some routes running through Cambridge.

Large institutions similarly operate private transportation for students. MIT runs several local and regional shuttle services, and its students ride the EZRide shuttle for free. Harvard operates its own bus network throughout its Cambridge and Allston campuses, which shuttled 870,000 passengers in 2016.[49]

Technology-driven businesses are emerging as another sector within the mobility ecosystem, offering private alternatives to public transit. Until recently, one startup operated a private bus system in the region, bringing commuters from Allston and Coolidge Corner to Kendall Square. Smartphone-based ride-hailing services, such as Uber and Lyft, offer another mobility option addressing gaps in the transportation system. Because these are private companies, the aggregate impact of these services on mobility in Cambridge is not yet known.

48 Charles River Transportation Management Association, Development and Operations of EZRide Shuttle, 2015
49 Harvard University, Town–Gown Report, 2016

Climate & Environment

Cambridge is a dense, transit-oriented city with a progressive environmental tradition and ambitious environmental planning underway. The City is working to enhance environmental quality for all and decrease its impact on the climate and regional ecosystems. Indeed, Cambridge's soil, air, water, and waste stream have improved in the decades of regional deindustrialization, growing acknowledgment of environmental issues, and concerted action by local government. However, as the impacts of global climate change become more apparent, Cambridge must also contend with increased risk of flooding and extreme heat. These risks stem from a changing physical environment, but social and economic conditions will affect who is most impacted by climate change. As Cambridge takes on these varied issues, the city must work to address its aging infrastructure, its regional role as a growth center, and the need for coordinated action.

Learn more about . . .

"Energy and Greenhouse Gas Emissions" on page 114

"Projected Climate Change Impacts" on page 120

"Recycling and Waste" on page 124

"Air Quality" on page 125

"Water" on page 126

"Soil Quality and Impervious Surface" on page 128

"Tree Canopy" on page 130

"Policy Context: Climate and Environment" on page 118

Energy and Greenhouse Gas Emissions

Climate scientists agree that greenhouse gas emissions have set the Earth on an irreversible course to climate change, which means patterns of temperature, precipitation, and sea level will continue to shift for some time. Cambridge must continue to mitigate its impact on the climate through efforts focused on reducing emissions from building operations, transportation, and waste. *(See "Climate and Environment Policy Highlights" on page 118 for more details on those efforts.)*

Cambridge has a strong commitment to reducing its greenhouse gas (GHG) emissions, a byproduct of conventional energy utilization created through the burning of fossil fuels. In 2012, GHG emissions originating in Cambridge amounted to 1.46 megatons of carbon dioxide and equivalent particles released into the atmosphere—13.24 tons of carbon dioxide equivalent per resident or 7.2 tons for each resident and worker in the city.[1] The powering, heating, and cooling of buildings account for the majority of Cambridge emissions.[2] Commercial and institutional buildings alone result in 65% of Cambridge's overall emissions, when including properties powered by district energy systems.[3] The combined emissions from all building operations and building construction represents 82% of Cambridge's GHG emissions.

The remainder of emissions are attributable to transportation and waste disposal. Transportation, particularly on-road transportation like cars and trucks registered in Cambridge, accounts for 11% of total city emissions.[4] Of those on-road transportation emissions, gasoline combustion from private vehicles generates the majority of greenhouse gases. Waste accounts for the last 6% of emissions, the majority of which come from solid waste disposal.

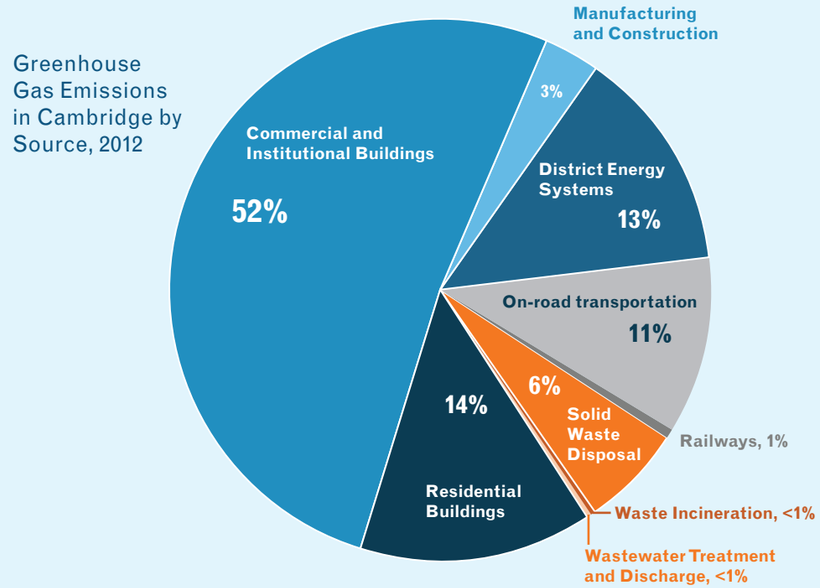
The City of Cambridge has set the goal of achieving net zero GHG emissions by 2050.

Since the majority of Cambridge's energy is used to operate buildings, building energy consumption requires particular attention. The City requires owners of large buildings report on their annual energy consumption.[5] Only 7% of Cambridge buildings are required to report their energy use, but these buildings compose 57% of the city's built area.[6] Office and laboratory buildings generate 30% of these buildings' emissions. The amount of energy consumed per square foot is greatest in laboratory buildings, which are part of Cambridge's universities and booming life sciences sector.[7]

The City of Cambridge has set goals to achieve net zero GHG emissions by 2050, to be achieved through a combination of energy efficiency in existing buildings, net zero new construction, and a low carbon energy supply.[8] The development trends around the city increase the difficulty of achieving this goal; in particular, research laboratories—the building type with the highest energy use per square foot—are growing in number.[9] Similarly, projected increases in summer heat as a result of climate change could result in increased electricity demand, due to the increased reliance on air conditioning. Electricity use per year could increase by as much as 57%.[10] These impacts will not be consistent across Cambridge, as certain neighborhoods are more susceptible to increased temperatures and heat waves due to differences in tree canopy coverage, surface types and colors, availability of air conditioning, and building typologies and ages.

1 Cambridge GHG Emissions Inventory, 2017 (2012 data). This most recent inventory is Cambridge's first to conform to the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories. Comparisons between this inventory and previous inventories are therefore unsound.
2 Ibid.
3 Ibid.
4 Ibid. This analysis does not include vehicles registered elsewhere that travel into or through Cambridge. This method of counting emissions from vehicles follows the Global Protocol for Community-Scale Greenhouse Gas Emission Inventories. In the long term, this method avoids double-counting of vehicle emissions. At present, however, other municipalities do not count their emissions according to this protocol (or at all).
5 Under the Building Energy Use Disclosure Ordinance (BEUDO), large buildings include non-residential buildings with at least 25,000 square feet of space, residential buildings with at least 50 units, and municipal buildings with at least 10,000 square feet of space. Reporting is also required for properties with multiple buildings, when those buildings' total space meets the reporting thresholds.
6 Cambridge CDD, Building Energy and Water Use Report, 2015
7 Ibid.
8 City of Cambridge Net Zero Action Plan. See "Climate and Environment Policy Highlights" on page 118 for more details.
9 Cambridge Energy and Water Use Report, 2015
10 Analysis for Climate Change Preparedness and Resilience Plan, under development and subject to change

Buildings generate 82% of Cambridge's GHG emissions, including those powered by District Energy Systems.

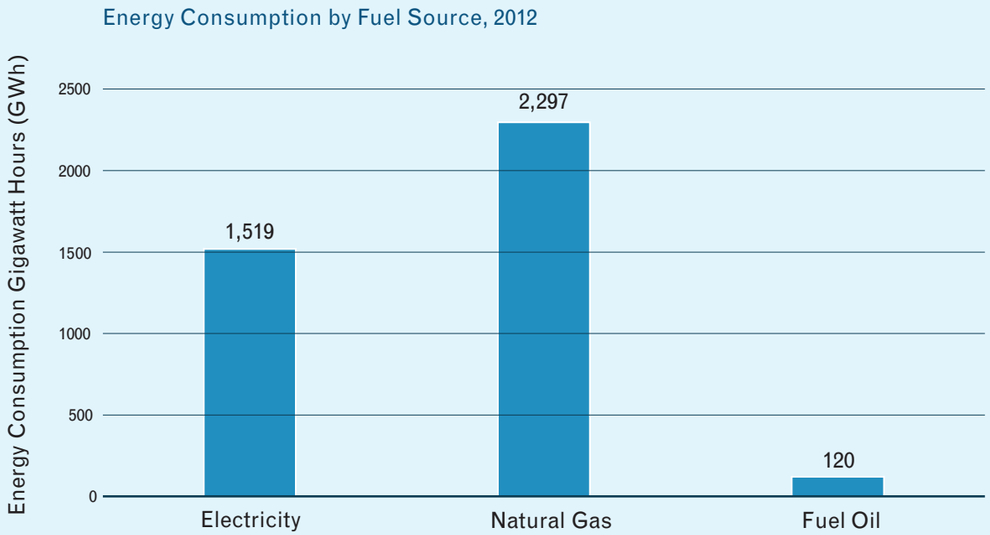


As we move toward Net Zero, we also need to create a strong, cohesive community, because we will face climate disasters regardless of our efforts.

— Cambridge resident via online survey

Source: Cambridge GHG Emissions Inventory, 2017. District Energy Systems includes the MIT, Harvard, and Biogen cogeneration facilities, as these plants primarily supply energy to the buildings on their respective campuses. The Kendall Cogeneration Station (operated by Veolia) is not included in this category.

The majority of energy consumed by buildings is generated through the combustion of natural gas.



Source: Cambridge GHG Emissions Inventory, 2017

On the production side, 60% of energy consumed by Cambridge buildings is generated from natural gas, a fossil fuel.[11] Residential buildings, K-12 schools, and hospitals tend to rely more on natural gas for heating, compared to commercial, mixed-use, and university buildings, which rely more on the regional electric grid and local district energy systems as energy sources.[12]

The regional electric grid is powered by a mix of energy sources. Natural gas power plants are the largest source, generating 49% of the electric grid's power.[13] In 2016, renewable resources (biomass, hydropower, solar, and wind) generated 13% of the grid's energy, while nuclear plants generated 31% of the electricity.[14] The amount of renewable energy powering the grid is required by Massachusetts law to increase at least 1% per year.

The electric grid's recent reductions in GHG emissions is largely attributable to the substitution of coal and oil with natural gas, as gas generates the least emissions of all the fossil fuels. However, gas does not represent a sustainable strategy for emissions reductions, as gas is only more emissions-efficient than the grid's oldest, least sustainable energy production facilities, which will soon be phased out. Furthermore, the grid is also expected to reduce its use of nuclear power as older nuclear plants are decommissioned, potentially requiring more fossil fuel use and increasing GHG emissions.

11 Cambridge GHG Emissions Inventory, 2017
12 City of Cambridge, Building Energy and Water Use Report, 2015
13 ISO New England, "2016 Net Energy and Peak Load by Source," 2017
14 Ibid.

The emissions from all buildings and building construction represents 82% of the GHG emissions produced in the city.



Policy Context: Climate and Environment

Cambridge undertakes many initiatives to mitigate greenhouse gas emissions, protect the city from the effects of climate change, prevent and ameliorate pollution, and improve environmental quality. The City's efforts helped it achieve the highest-ever score given by STAR Communities, an organization that rates cities on their sustainability. This list is a limited selection of the City's environmental programs.

Energy and Emissions

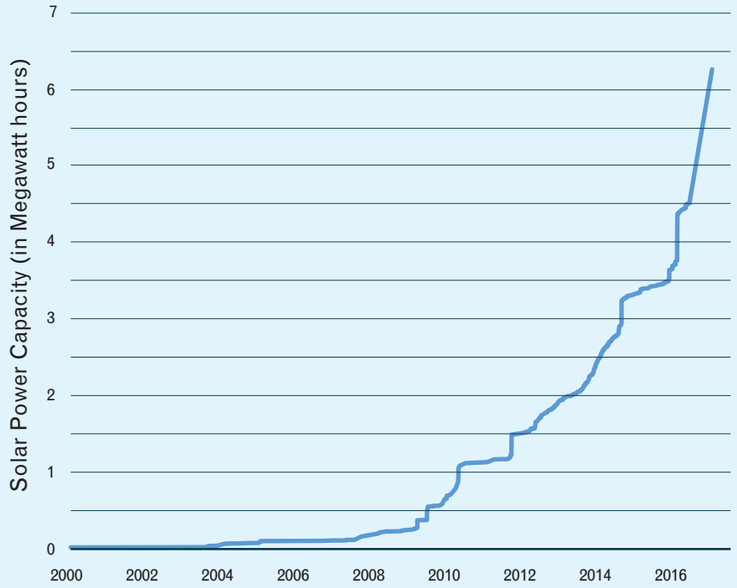
- The City adopted a Climate Protection Plan in 2002, a comprehensive approach to GHG emissions reductions that refocused efforts on building energy, the largest source of emissions. An updated Climate Protection Plan is underway.
- The Net Zero Action Plan aims to eliminate greenhouse gas emissions from buildings by midcentury. This plan includes multiple efforts to be implemented over 25 years, such as building design optimization, on-site renewable energy production, and mandated large building energy use reporting.
- The Building Energy Use Disclosure Ordinance (BEUDO) requires larger buildings to annually report energy use, water use, and basic property information through Energy Star Portfolio Manager to the City of Cambridge, which then posts the data on the City website.
- The Cambridge Energy Alliance assists residents and businesses in accessing renewable energy. The program connects constituents to city, state, and private assistance, including no-cost building assessments, weatherization services, financing for solar energy infrastructure, and more.
- The Climate Change Preparedness and Resilience (CCPR) Plan currently underway aims to create a city resilient to the effects of climate change, especially flooding and rising temperatures. The plan accounts for both the physical and social elements of resilience planning, and it builds on the City's Climate Change Vulnerability Assessment.
- The City has engaged in many efforts to increase the use of sustainable transportation modes, which help decrease GHG emissions. For more information, see "Policy Context: Mobility" on page 95.

Landscape and Ecology

- The Department of Public Works' Parks and Urban Forestry division manages Cambridge's 19,000 public trees, in addition to the city's open spaces. 90% of tree planting requests to the division are completed within one year. The City has accelerated its number of tree plantings each year since Fiscal Year 2013. The department is currently developing an Urban Forest Master Plan.
- The Arbor Day Foundation has designated Cambridge a Tree City USA community for 23 years and given the city a Tree City USA Growth Award for eight years.
- Cambridge and neighboring communities jointly reduced the volume of combined sewer overflows (CSOs, a discharge of untreated sewage due to heavy rains) into Alewife Brook and the Upper Mystic River by 85% between 1988 and 2016.
- In 2017, the US EPA gave the Charles River a "B" in water quality, having improved significantly since the launch the EPA's Charles River Initiative in 1995. These improvements were due to a significant reduction in the amount of CSO discharges to the river over the past 20 years, as well as enforcement of water quality standards and removal of illicit discharges. Alewife Brook's rating remains a "D+," however.
- The City Council mandated recycling at all buildings in 1991. Since then, the City's efforts to reduce waste include curbside single-stream recycling pickup, a growing pilot program for curbside compost pickup, planning for zero waste, a ban on styrofoam for single-use serviceware at food and drink establishments, a ban on plastic checkout bags at retail establishments, and a charge on other disposable checkout bags. Almost half of household waste is now curbside recycling, and curbside composting diverted 35% of participating households' trash in the pilot's first year.

Solar power capacity in Cambridge increased by more than 600% between 2010 and 2017.

Cambridge Solar Power Generation Capacity, 1997–2017



Source: Cambridge Energy Alliance

Distributed energy resources (DER) are smaller power sources that can be used to produce energy across the city. In 2012, there was 35 megawatts of electric generation capacity in Cambridge, from 13 natural gas-fired systems, 5 wind energy demonstration projects, 1 biodiesel project, and 111 solar energy systems.[15] Since then, the number of solar systems grew to 505.[16] Cambridge's known solar energy generation capacity as of August 2017 is 5.8 MW of electricity, only 1.7% of the city's *potential* capacity.[17]

All distributed energy resources have positive environmental impacts, as they lose less energy during transmission and build a more disaster-resilient energy system (as long as the energy is stored and the system is capable of operating without the electrical grid).

15 Peregrine, Cambridge Building Energy Primer, 2014
16 Cambridge Solar Potential Report, August 2017, cambridgema.gov/solar
17 Ibid.

Projected Climate Change Impacts

Even if Cambridge can reduce its greenhouse gas emissions dramatically, the city must also prepare for a changing environmental context. Climate change not only increases the risk of disasters and extreme weather, but also creates "new normal" weather patterns—different than those of the past. The City is currently formulating a Climate Change Preparedness and Resilience Plan, an effort to address climate change's various impacts, including flooding, higher temperatures, and extreme heat. Envision Cambridge works in conjunction with that planning effort to address climate challenges in holistic ways.

Flooding

Climate change is expected to raise sea levels, while also causing more frequent and more intense storms. The combined effects of sea level rise and storm surges endanger flood-prone areas and require buildings and infrastructure to adapt to the risk of flooding. The most flood-prone areas overlap with Cambridge's historic riverine wetlands, which were filled in for development over the last two centuries.

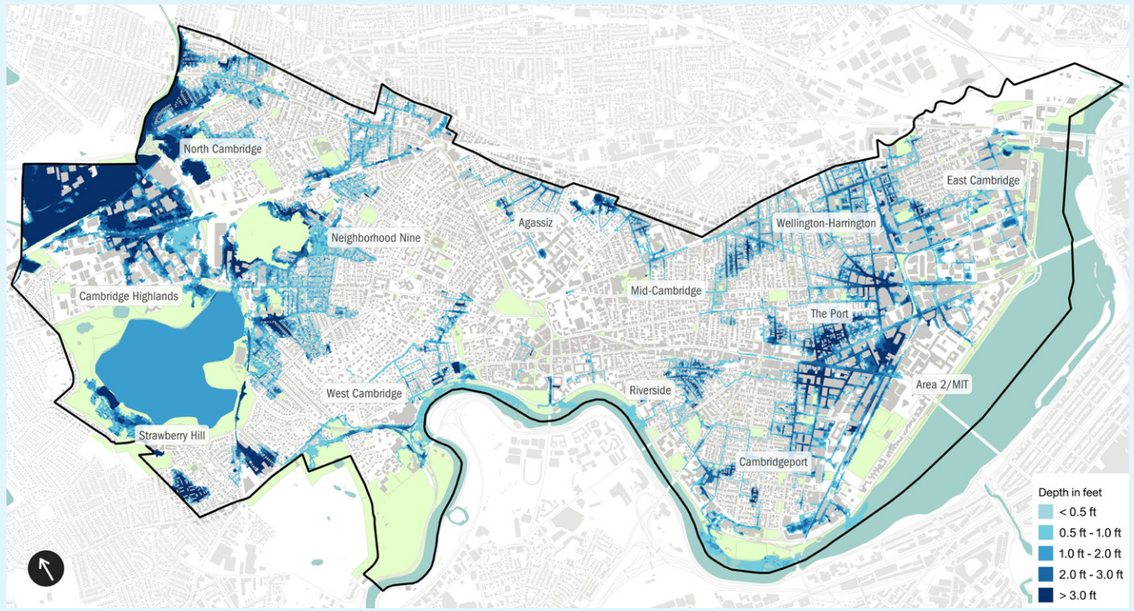
Apart from sea level rise and storm surges, climate change will cause more frequent and powerful storms, and increased precipitation from those storms will cause flooding. Inland areas could see flooding during heavy rains, particularly where large amounts of impervious surfaces (like buildings, roads, and parking lots) cause the stormwater disposal system to be overwhelmed by water.[18] *(See map on next page for an illustration of estimated flooding.)*

Climate-induced flooding will have broad impacts, particularly for the socioeconomically vulnerable. For instance, without mitigation, flooding could affect drinking water quality, overwhelm emergency services, and slow the economy. Given current infrastructure, Alewife Brook would overflow its banks, while the stormwater and sewer systems in the Port would back up and flood the street in the event of an 100-year storm.[19] With increasing precipitation and higher sea levels, storage and conveyance of water may also become more difficult, meaning flood-prone areas would remain flooded for longer periods of time. New and existing development must adapt to these changing conditions.

18 City of Cambridge Climate Change Vulnerability Assessment, November 2015. Subject to revisions based on ongoing analysis.

19 Ibid. A 100-year storm is a hydrologic event that has a 1% chance of occurring in any given year. Areas affected by such a storm are called the 100-year floodplain. Over the life of a typical mortgage, there is a 26% chance of a property in the 100-year floodplain will be affected by flooding. For more information, see USGS, "100-Year Flood—It's all about chance," 2010

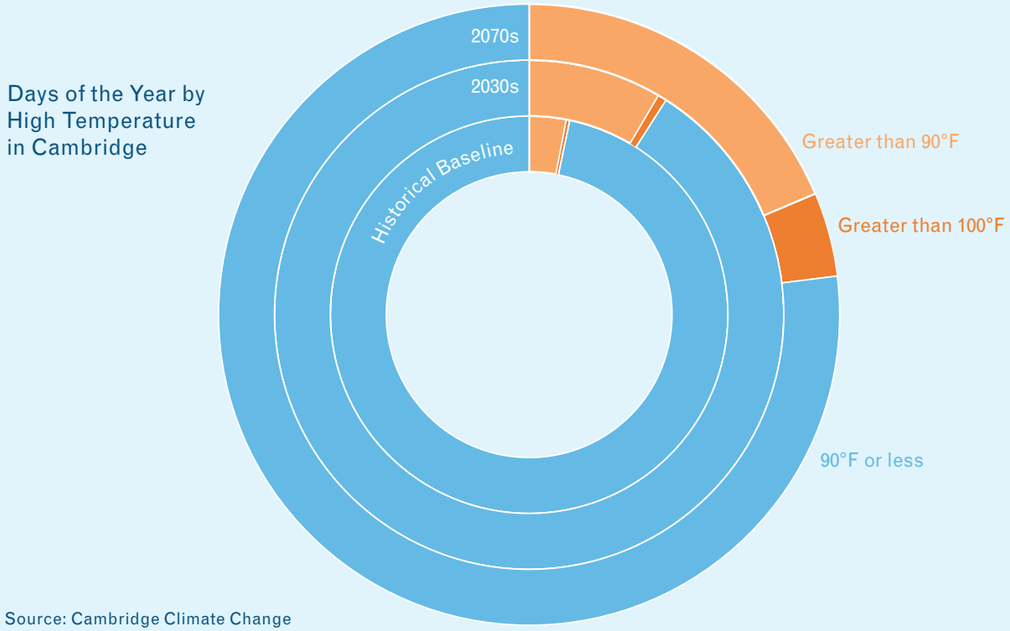
Projected flooding from a 100-year 24-hour storm in 2070 would impact most of Alewife and the Port.



Projected Flooding from a 100-Year, 24-Hour Storm in 2070

Source: City of Cambridge Climate Change Vulnerability Assessment, November 2015. Subject to revisions based on ongoing analysis.

By 2070, there could be more than 3 months in each year with temperatures over 90°F.



Source: Cambridge Climate Change Vulnerability Assessment, 2015. This graph shows the estimates of that study's "High Scenario," which assumes a continued dependence on fossil fuels as the primary energy source.

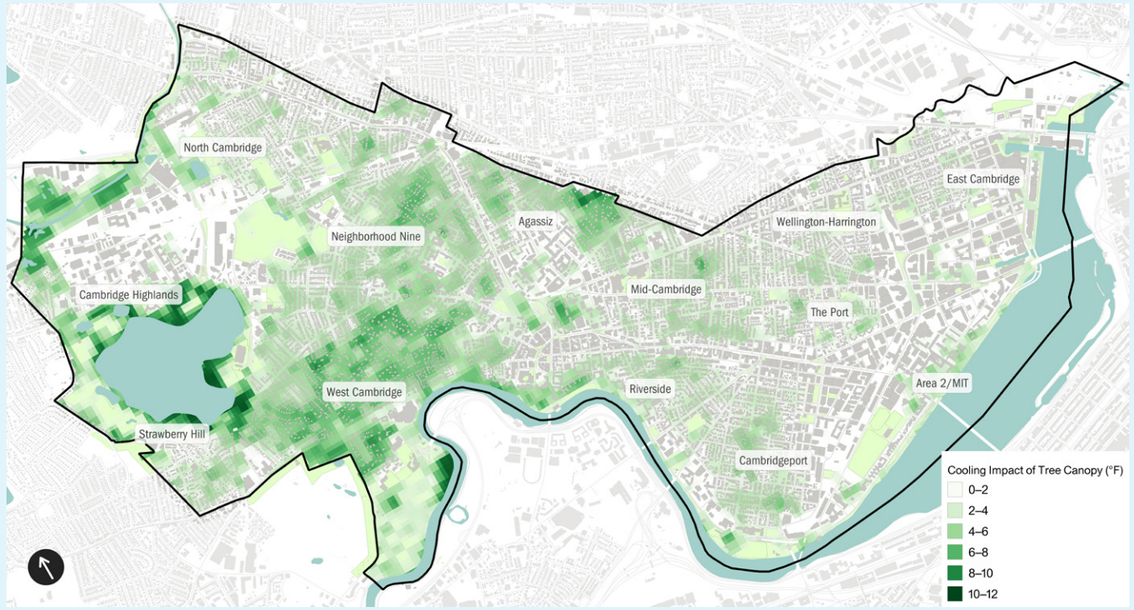
Heat

Apart from flooding, climate change will also increase temperatures. By 2030, the number of days above 90°F each year could triple.[20] By 2070, there could be more than 3 months each year that are over 90°F, and heat waves (3 or more days of high temperatures) are predicted to be more common.[21] Because pavement and building materials absorb more heat than unpaved and unbuilt ground, high temperatures become even more extreme in cities.[22] Cambridge's areas with the densest buildings, the most paving, and the least tree canopy cover are most at risk for extreme heat as the climate changes. These areas include Alewife, the Massachusetts Avenue and Cambridge Street corridors, parts of East Cambridge, and the formerly industrial edge between Cambridgeport and Area 2/MIT.[23]

If no action is taken, the entire city could be physically dangerous during heat waves by 2070.[24] Heat waves are particularly dangerous for the very young, the elderly, and those with existing health challenges.

20 Cambridge Climate Change Vulnerability Assessment, 2015
21 Ibid.
22 This is called the "urban heat island effect."
23 Cambridge Climate Change Vulnerability Assessment, 2015
24 Ibid.

The cooling impact of Cambridge's tree canopy is lower in Alewife and in the city's eastern neighborhoods.



Cooling Impact of Cambridge's tree canopy

Source: Kleinfelder, City of Cambridge Climate Change Preparedness and Resilience Plan. See page 130 for a map of the tree canopy itself.

Recycling and Waste

The City's Department of Public Works hauls away waste for approximately 70% of Cambridge households.[25] Cantabrigians throw away 17.5 pounds of trash per household per week.[26] To reduce the amount of trash dumped into landfills or incinerated, the City of Cambridge has introduced a number of initiatives.

In 2010, Cambridge switched to single-stream recycling, making it easier for residents to recycle by eliminating the need to sort recyclables. Before the program launched, Cambridge residents recycled approximately 35% of their waste by weight. Initial data from the introduction of single-stream indicates that recycling rates increased to 47% of household waste.[27] This places Cambridge above the national 34% recycling rate.[28]

In 2014, Cambridge piloted a curbside composting program (for collection of food waste and other organic materials), collecting compost from 554 households. In 2015, the pilot program expanded to more than 5,000 households. In the initial pilot, curbside compost pick-up diverted nearly 35% of trash by weight away from the waste stream. Furthermore, all 13 public schools in Cambridge have recycling and composting during breakfast and lunch. Furthermore, composting contributes to Cambridge's climate goals, as composting organic materials reduces carbon emissions that are otherwised released through incineration or decomposition.

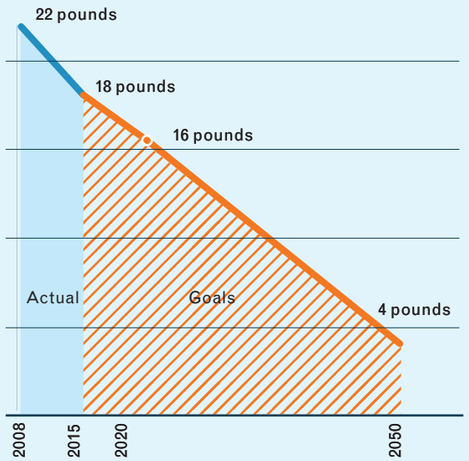
Cambridge is on track to meet the state Department of Environmental Protection's goals of reducing residential trash 30% by 2020 and 80% by 2050 (from a 2008 baseline), and the City initiated a zero waste planning process in 2016.

While recycling is mandatory, recycling rates for commercial buildings are typically unknown, as commercial waste is handled by private contractors.

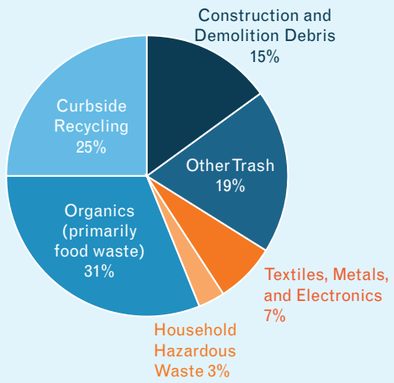
25 Cambridge Department of Public Works, 2017
26 Ibid.
27 Ibid.
28 US Environmental Protection Agency, "Advancing Sustainable Materials Management: Facts and Figures," 2014

Between 2008 and 2015, Cambridge reduced its weekly waste per household 18%, to 17.5 pounds per household.

Weight of Household Waste per Week and Waste Reduction Goals, 2008–2050



Cambridge's Weekly Waste by Waste Type, 2015



Source: City of Cambridge Department of Public Works. Goals are are based on the Massachusetts Department of Environmental Protection's Solid Waste Master Plan.

Air Quality

Historically, Cambridge's air quality was polluted by local and regional industries, electricity and heat generation, and automobiles. Over the decades, air quality has improved as heavily polluting industries have left the region, regional electricity production transitioned from coal to cleaner-burning natural gas, and the federal government imposed vehicle emissions standards. The Greater Boston region's air quality has continued to improve over the last five years. However, the localized impacts of air pollutants can be acute near highways, near buildings using heavy heating oils, and in neighborhoods with fewer trees that can filter out pollutants. Ozone and particulates are especially concerning. Air pollution worsens on hotter days and will be exacerbated as climate change brings higher temperatures. Allergens will also become more of a concern. Increased regulation and the phasing out of fossil fuels can mitigate air quality hazards.



Water

Cambridge's development was historically defined by its relationship to its water resources: the Charles River, Alewife Brook leading into the Mystic River, Fresh Pond, and the wide swaths of swamps. The city's industries, its settlement patterns, and its peoples' ways of life were tied to the proximity to these water bodies. Over time, development and industry changed Cambridge's relationship to water, and the quality of the water itself. Heavy industries and infrastructure polluted Cambridge's rivers and ponds, swamps were filled in to create new land, and some streams were buried and paved over.

While heavy industry has declined in New England and former threats to water quality have been resolved, challenges to Cambridge's water resources remain. Polluted stormwater, combined sewer overflows, aging infrastructure, and climate change are now the leading drivers of water quality concerns.

Stormwater and Sewer

Most of the city's 250-mile sewer and drainage system were constructed in the late nineteenth and early twentieth century. Cambridge's stormwater system is one of five in the Boston region constructed to be combined with its sewer system. Combined systems carry stormwater and sanitary flow in the same pipe. They perform well during dry weather and in moderate storm events. However, when intense rainfall events occur, most of the capacity of these pipes is occupied by stormwater, causing back-ups into people's homes and combined sewer overflows into the river. Climate change will exacerbate these issues, with the increasing frequency and intensities of storms that it will cause.

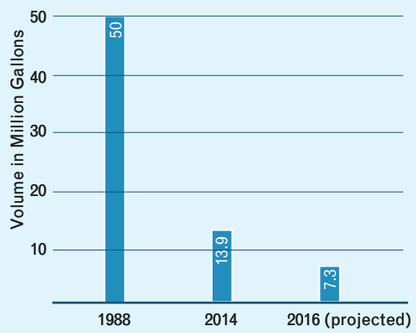
When systems are separated, the sewer flows are carried in a separate pipe, no longer have to compete with stormwater, and backups are much less frequent. More than half of the City's system remains a combined sewer and stormwater system.

The City, working with state and nearby municipal partners, has been upgrading its infrastructure, separating sewer systems, implementing green infrastructure to treat stormwater, and enhancing the structural condition of the existing system.

These efforts successfully improved the condition and reliability of the City's water infrastructure, as well as the quality of water bodies receiving Cambridge stormwater. Between 1998 and 2016, the volume of untreated combined sewer overflow discharged to the Alewife Brook decreased 85%. The sewer separation in the Whittemore Avenue, Huron Avenue, and Concord Avenue neighborhoods, including the new Alewife Brook Stormwater Wetland, were critical in implementing this water quality improvement.

Between 1988 and 2016, the volume of raw sewage dumping into Alewife Brook has decreased 85%.

Annual Untreated CSO Discharge Volume in Alewife Brooke / Upper Mystic River



Source: MWRA, CSO Annual Report, 2016

The City of Cambridge owns 9% of the land in its watershed to protect water quality.



The Walter J. Sullivan Water Purification Facility at Fresh Pond.

Drinking Water

The Water Department is a municipally owned utility whose mission is to provide a safe, uninterrupted water supply of the highest quality to the citizens of Cambridge. The Massachusetts Legislature first gave the City of Cambridge the right to acquire Fresh Pond for the city's drinking water in 1888. Today the Cambridge Water System includes a 24 square-mile watershed, containing Hobbs and Stony Brook reservoirs in Lexington, Lincoln, Waltham, and Weston, and an underground reservoir in Belmont.[29]

Because of the developed nature and types of land uses within the Cambridge watershed, the city's source waters are highly susceptibile to contamination.[30] In 2011, the Water Department prepared a Source Water Protection program, which includes extensive monitoring, emergency response planning, partnership development, stormwater management, and more. Furthermore, the City owns roughly 9% of all land in the watershed. Cambridge's drinking water consistently meets or exceeds all state and federal quality standards, including those for levels of chlorine, lead, and turbidity (the water's cloudiness).

The water system includes:

- A 10.5-mile transmission system that carries water from the Hobbs and Stony Brook reservoirs to Fresh Pond and the Sullivan Water Purification Facility on Fresh Pond Parkway;
- 185 miles of water mains. Approximately 50 miles of the existing water mains are over 70 years old;
- More than 16,000 service connections.

Cambridge's consumption of fresh water trended down in the last decade, despite population and jobs growth.[31] Nonetheless, drought conditions in 2016 depleted Cambridge's water reserves, and the City decided to temporarily purchase water from the regional water provider, the Massachusetts Water Resources Authority. Following this drought, the City initiated a water conservation planning process that is currently underway.

29 Water Department, Drinking Water Quality Reports, 2007–2017
30 Ibid.
31 Ibid.

Soil Quality and Impervious Surface

Soils in Cambridge are a complex synthesis of natural conditions and human alterations to the landscape. Impervious surfaces such as streets and buildings cover 74% of Cambridge's land area.[32] An additional 9% of current soils were either not initially topsoils and exposed through site grading during development, or they were added to the landscape through landfill.[33] Approximately 34% of the city sits in areas that were once the river, swamps, wetlands, floodplains, or small islands in the river.[34] Alternating layers of garbage and topsoil compose a small portion of Cambridge soils, such as at Danehy Park, which was once the city's landfill.[35]

The only large stretches of soil untouched in these ways are found at Fresh Pond, Alewife Brook Reservation, and Mount Auburn Cemetery, and these account for less than 6% of Cambridge's soils.[36] Unaltered soils in these areas, in addition to smaller patches interwoven with paved land, tend to be nutrient rich.[37]

The Massachusetts Department of Environmental Protection has identified 1,057 sites with oil or hazardous material contamination.[38] The majority of these sites have been cleaned up or otherwise represent no significant risk, though certain uses may be restricted.[39] These sites are found across Cambridge but are particularly concentrated in formerly industrial districts and along commercial corridors.

Lead contamination in soils (as in homes) is an additional concern citywide. Paints containing lead were used regularly in houses built before 1978, and lead was added to gasoline through 1985. Both practices resulted in lead contamination in soils near older housing and along historic roads. Although child blood lead levels have decreased over time, lead exposure remains a risk in Cambridge.

32 Cambridge CDD
33 US Department of Agriculture Natural Resources Conservation Service, Soil Survey Geographic Database, 2012
34 Ibid.
35 Ibid.
36 Ibid.
37 Based on descriptions of soil types in Soil Survey of Norfolk and Suffolk Counties, MA (Peragallo, 1989).
38 Massachusetts Department of Environmental Protection, 2017
39 Ibid.

74% of Cambridge is covered with impervious surfaces.



Citywide Impervious Surfaces

Source: Cambridge Community Development Department

Tree Canopy

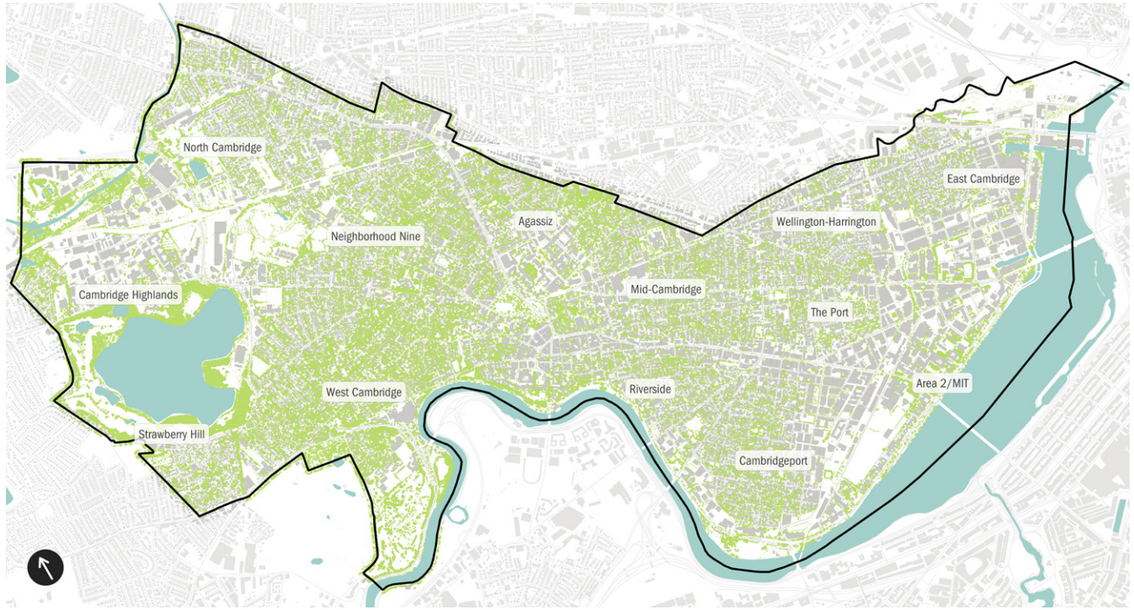
Cambridge's ecology includes the trees on public and private land that filter the air; provide shade, cooling, and aesthetic amenity for Cambridge residents, workers, and visitors; and serve as a habitat and corridor for wildlife. Roughly 30% of the city's area is covered by this tree canopy.[40] However, the canopy cover is uneven across the city. In one section of Neighborhood Nine, as much as 45% of land area is shaded by trees (including street trees, trees in parks, and trees on private land).[41] That figure drops to 15% in the heart of East Cambridge, and only 11% in Area 2/MIT.[42]

There are 19,000 public trees in Cambridge.

There are nearly 21,900 trees and tree wells in Cambridge, including more than 19,000 public trees. The City plants between 300 and 500 trees per year, and recently upgraded its planting specification to include watering all newly planted trees for two years to help them thrive. The City also works with property owners to plant trees on private property near public sidewalks where the sidewalk is too narrow for street trees.[43]

Cambridge is physically capable of increasing its tree canopy to cover a maximum of 65% of the city, though that level of canopy coverage is unlikely, due to competing land uses and other factors.[44]

40 City of Cambridge Community Development Department
41 Ibid.
42 Ibid.
43 City of Cambridge Department of Public Works
44 University of Vermont Spatial Analysis Lab, Cambridge Urban Forest Canopy Assessment, 2012



Citywide Tree Canopy Coverage

Source: Cambridge Community Development Department

Next Steps

Cambridge Today lays out data and trends to understand how Cambridge is changing and how these changes affect the city's communities. While a city is certainly more than a collection of data or an array of policies, this information can be used to determine how well Cambridge's current policies and lived experiences reflect the goals and core values of the community. The next stage of Envision Cambridge will be a robust public conversation about the new policies and plans needed to guide change in Cambridge while continuing to align with the community's core values and shared vision.



Where Do We Go from Here?

This early portion of Envision Cambridge has brought into focus where Cambridge is today, what issues and opportunities the city faces, and the community's shared vision for the future. With this in mind, the plan will seek to address how the City and the members of the community can work together to achieve this vision.

One of the key priorities is to protect and enhance Cambridge's assets. Many of the city's successes are made possible by Cambridge's small geographic footprint, dense fabric, historical development pattern, thriving economy, and strong community ties. These characteristics enable active lifestyles and social and economic opportunities unavailable in other places. As a community, Cambridge must take steps to preserve and enhance these assets. Furthermore, Cambridge can build on the positive aspects of these assets by making them more widely accessible to all members of the community.

Cambridge must also prepare for and respond to external factors that affect the city. Some challenges are regional, national, and even international. These include climate change and its related hazards; regional mobility, including cross-region traffic moving through Cambridge; and the impacts of regional growth on housing supply and demand. Cambridge can be a leader in addressing these issues. Regardless, Cambridge must take steps to address these concerns while continuing to preserve the city's heritage and character.

Finally, the Cambridge community must envision a future in which the city fully embodies its core values. How can the city continue to grow in diversity, equity, livability, and resilience through policies related to urban form, housing, economic development, mobility, and the environment? Envision Cambridge must also allow the community to decide where these changes can be best accommodated in the city.

During the remainder of the Envision Cambridge process, the plan will identify specific strategies to advance the community's shared vision, embody its core values, and guide future change in Cambridge.



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