City of Cambridge

2015 Transit Strategic Plan

http://cambridgema.gov/transit

For more information, please contact:

Tegin Bennett
tbennett@cambridgema.gov
617/349-4615

City of Cambridge
Community Development Department
Environmental and Transportation Planning Division
344 Broadway
Cambridge, MA 02139

http://cambridgema.gov/transit

Table of Contents

Figure 1. A variety of transit modes serve Cambridge, many of which are shown here. Starting at top left and moving clockwise: Central Square Red Line Station entrance,[1] EZRide shuttle,[2] Route 1 buses,[1] Commuter Rail train,[3] Green Line trolley,[3] and Hubway bicycles.[1]

Credits

Richard C. Rossi, City Manager
Lisa C. Peterson, Deputy City Manager
Iram Farooq, Acting Assistant City Manager for Community Development

Interdepartmental Staff Working Group

- Project Manager: Tegin Bennett, Environmental & Transportation Planning
- Previous Project Manager: Jeff Rosenblum, Environmental & Transportation Planning
- Joseph Barr, Director, Traffic, Parking & Transportation Department
- Debbie Cheng, Department of Public Works
- Sue Clippinger, previous Director, Traffic, Parking, & Transportation Department
- Chris Cotter, Director of Housing
- Stuart Dash, Director, Community Planning
- Bill Deignan, Environmental & Transportation Planning
- Tom Evans, Executive Director, Cambridge Redevelopment Authority
- Stephanie Groll, Environmental & Transportation Planning
- Lisa Hemmerle, Director, Economic Development
- Jennifer Lawrence, Environmental & Transportation Planning
- Melissa Miguel, Department of Public Works
- Michael Muehe, Director, Commission for Persons with Disabilities
- Susanne Rasmussen, Director, Environmental & Transportation Planning
- Cara Seiderman, Environmental & Transportation Planning
- Adam Shulman, Traffic, Parking & Transportation Department
- Cleo Stoughton, Intern, Environmental & Transportation Planning
- Sue Walsh, Human Services
- Kathy Watkins, Assistant Commissioner/City Engineer, Department of Public Works
- Josefine Wendel, Cambridge Public Health Department
- Jason Zogg, Cambridge Redevelopment Authority

Cambridge Transit Advisory Committee (2013-15)

- John Attanucci, MIT, Transit Research Group
- Joseph Beggan, Harvard University
- Kelley Brown, MIT/Kendall Square Association
- Brian Dacey, Cambridge Innovation Center
- John DiGiovanni and Denise Jillson (alternate), Harvard Square Business Association
- Jacqueline Douglas and Jeremy Mendelson (alternate), LivableStreets Alliance
- Charles Fineman, Resident, East Cambridge
- Robert Fitzgerald, Resident, Mid-Cambridge
- Jim Gascoigne, Charles River TMA/Kendall Square Association
- Eric Hoke, Resident, Wellington-Harrington
- Jeffrey Lockwood, Novartis/Kendall Square Association
- Doug Manz, HYM Investment Group
- George Metzger, Central Square Business Association
- Susan Pacheco, Cambridge Council on Aging
- Katherine Rafferty, Mount Auburn Hospital
- Simon Shapiro, Cambridge Local First
- Saul Tannenbaum, Resident, Cambridgeport
- Ritesh Warade, Resident, Cambridge Highlands
- Participating agencies: MBTA: Todd Blake, Melissa Dullea, Philip Groth, Erik Scheier, and Greg Strangeways; MassDOT: Matt Ciborowski and Scott Hamwey

Previous members:

- Miriam Cooper, Commission for Persons with Disabilities
- Randa Ghattas, Resident, Area Four
- Terrence Smith, Cambridge Chamber of Commerce
- Zachary Spitz, Cambridge Youth Involvement Subcommittee
- Rev. Leslie K. Sterling, St. Bartholomew's Episcopal Church

CAMBRIDGE CDD@344
COMMUNITY DEVELOPMENT DEPARTMENT
344 Broadway

TRAFFIC, PARKING & TRANSPORTATION

Executive Summary

The City of Cambridge recognizes that better public transportation is critical in order to meet our economic development, livability, social equity, and environmental objectives.

A large proportion of Cambridge residents and workers already use and rely on public transit, as well as other sustainable, healthy transportation modes like walking and biking. With projected shifts in demographics, as well as predicted housing and economic development in the region, public transit will become even more vital to the region than it is today. It is important that the public transit system keep up with the changing needs of the region and that the City identify its role in accomplishing this goal.

To this end, in January 2013, the City launched a two-year public transit strategic planning process. The purpose was to develop an action plan for how Cambridge will take a stronger leadership role to improve the quality and expand the capacity of our transit system.

The process was led jointly by the Community Development Department and the Traffic, Parking & Transportation Department. The City formed an internal interdepartmental working group and an external stakeholder advisory committee, the Transit Advisory Committee, to guide this process.

Through monthly meetings with these groups since January 2013, a significant amount of input was gathered and synthesized into a set of seven overarching goals:

- Goal 1: Maximize Transit's Ability to Serve All Trips
- Goal 2: Increase and Prioritize Transit Funding
- Goal 3: Increase Efficiency and Reliability of Transit Services
- Goal 4: Expand Transit Service
- Goal 5: Improve Usability, Accessibility, and Safety
- Goal 6: Improve Public Outreach and Participation
- Goal 7: Improve Resiliency to and Preparedness for Climate Change

For each goal listed above, the report defines objectives and highlights key projects and initiatives already underway by the City. This strategic planning document will be used in the future to help select and prioritize projects that will improve the public transportation system in and around Cambridge.

In May 2013, the City of Cambridge established a Transit Advisory Committee to advance an agenda for a robust public transportation system for those who live and/or work in Cambridge.

The Committee guides Cambridge city positions and policies regarding long term sustainable funding for transit by the Commonwealth, transit expansion, service planning for modification or expansion of bus routes, and service reliability and improvements including ways to better design our street network to prioritize bus transit.

The Transit Advisory Committee is composed of residents from various parts of the city, as well as representatives of institutions, organizations and businesses. The goal is to represent a cross section of stakeholder groups (e.g., commuters, persons with disabilities, low income, elderly, youth, and advocates).

Figure 2. A few members of the Transit Advisory Committee.

Introduction

Better public transportation (also referred to as transit in this plan) is critical to meet the City of Cambridge's economic development, livability, social equity, and environmental objectives.

Public transportation in the context of this plan should be understood as shared service available to the general public, including modes such as subway, light rail, commuter rail, buses, and the Hubway bike sharing system (providing first and last mile services in addition to its own independent network). Providers include the publicly funded Massachusetts Bay Transportation Authority (MBTA) as well as privately funded or subsidized systems like Transportation Management Associations (TMAs). In addition, new forms of transit can emerge and could be considered in future updates to this plan.

The MBTA is the biggest provider of public transportation in our City. The MBTA is a state agency governed by the Massachusetts Department of Transportation (MassDOT) Board of Directors and, as of 2015, a temporary MBTA Fiscal and Management Control Board established by the Governor's special panel to address challenges the agency is facing. These challenges include $5.5 billion in outstanding debt and at least $6.7 billion in outstanding maintenance and modernization needs to reach a state of good repair.[4] In the face of these challenges, the agency is struggling to operate the current system, let alone expand.

It is a common perspective that municipalities have limited influence over the MBTA. The City contributes about $9 million per year for MBTA services in assessments[5] and is a voting member of the MBTA Advisory Board. Under the 2009 Transportation Reform legislation, the Advisory Board lost authority to approve the MBTA budget.

Despite this, the City can have significant influence on the MBTA. The experience of using transit is directly influenced by the City's ability to build and manage roads, sidewalks, signal equipment and timing, and other aspects of the public realm. City staff have also been playing an active role in influencing policy decisions that affect transit.

To acknowledge and better define the City's role in influencing public transportation, in January 2013, the City of Cambridge launched a two-year transit strategic planning process. The purpose was to develop an action plan for how Cambridge will take a stronger leadership role to improve the quality and expand the capacity of our transit system. A timeline for this initiative is shown in Figure 3.

The process was led jointly by the Community Development Department and the Traffic, Parking & Transportation Department. The City formed an internal interdepartmental working group and an external stakeholder advisory committee, the Transit Advisory Committee.

Through monthly meetings with these groups since January 2013, a significant amount of input was gathered and synthesized into a set of seven overarching goals and more detailed objectives, described later in this report. These are intended to be a guide to selecting and prioritizing projects that will improve the public transportation system in and around Cambridge and help inform the City's budgeting process. The report ends with a work plan containing short-, medium-, and long-term projects to meet these objectives.

To keep up with changing needs, it is expected that this plan will be updated regularly. The work plan itself will be a living document that is updated as work progresses.

This Transit Strategic Plan acknowledges the critical role of public transportation in our sustainable transportation system, but it does not exist in a vacuum. There are a variety of policies that affect the City's decision-making in transportation. There are also specific plans for other modes; in 2015, for example, a Bicycle Network Plan was also completed. During the design and construction of infrastructure in Cambridge, all of these inputs are considered in deciding how to allocate and design our limited public space to achieve the City's goals related to, among others, climate change, social equity, and economic development.

Figure 3. Cambridge Transit Strategic Planning Process Timeline.

Regional Context

"The scale and complexity of the region's challenges make it clear: making a Greater Boston Region requires a transformative plan, a sustainable plan that will improve equity among our residents, strengthen the economy, protect the environment, and improve our quality of life."
— MetroFuture, 2008[6]

Over 70 percent of the Massachusetts population lives within the MBTA service district and takes about 1.3 million trips each day.[7]

According to MetroFuture,[8] a long-range regional land use plan published in 2008 by the Metropolitan Area Planning Council (MAPC), the region's population is expected to both grow and change by 2030. The plan predicts half a million new residents, an increase of about 13 percent, as well as about 300,000 new jobs and 350,000 new housing units. It is also expected that average household sizes will decrease and demand for multi-family homes will increase, due in part to an increase in the percentage of aging adults (who will be downsizing their homes) and the need to attract younger people to the region to fill labor gaps.

With these changing needs, MetroFuture makes the case that the region will be stronger if housing and job growth is concentrated in municipalities already well served by transit and other infrastructure. This "smart growth" would be more sustainable because compact development patterns are readily served by transit and other sustainable modes of transportation like walking and biking. In the MetroFuture vision, Cambridge will need to be even better served by transit than it is today.

An expanded transit system would provide better service to both urban and suburban areas, link more homes and jobs, and serve more areas than it does today. The travel demand model of the Boston region Metropolitan Planning Organization (MPO) projects that by the year 2035 there will be a seven percent increase in trips by automobile and a 30 percent increase in trips by transit in the region,[9] levels that will require increased transit capacity. In addition, the Massachusetts Department of Transportation (MassDOT) has established a statewide mode shift goal of tripling the share of travel in Massachusetts by transit as well as walking and bicycling.[10] Driving trends are already changing: younger Americans in particular are driving less, though decreases in vehicle miles traveled can be seen in every age group.[11]

Despite this projected growth in transit demand, decades of underfunding the MBTA have resulted in neglect of the ongoing maintenance needed to keep the system working reliably and safely, regardless of expansion. While current fiscal challenges make it difficult to consider increasing the capacity of our system, without this investment we will be unable to meet the projected mobility needs in the future.

MAPC's "Stronger Region" scenario[12] predicts that by 2040 there will be:

- ↑ 13% increase in the number of residents in our region
- ↑ 7% increase in the size of the labor force in our region
- ↑ 24% increase in the number of housing units in our region
- 62% of new housing units will be in multifamily buildings

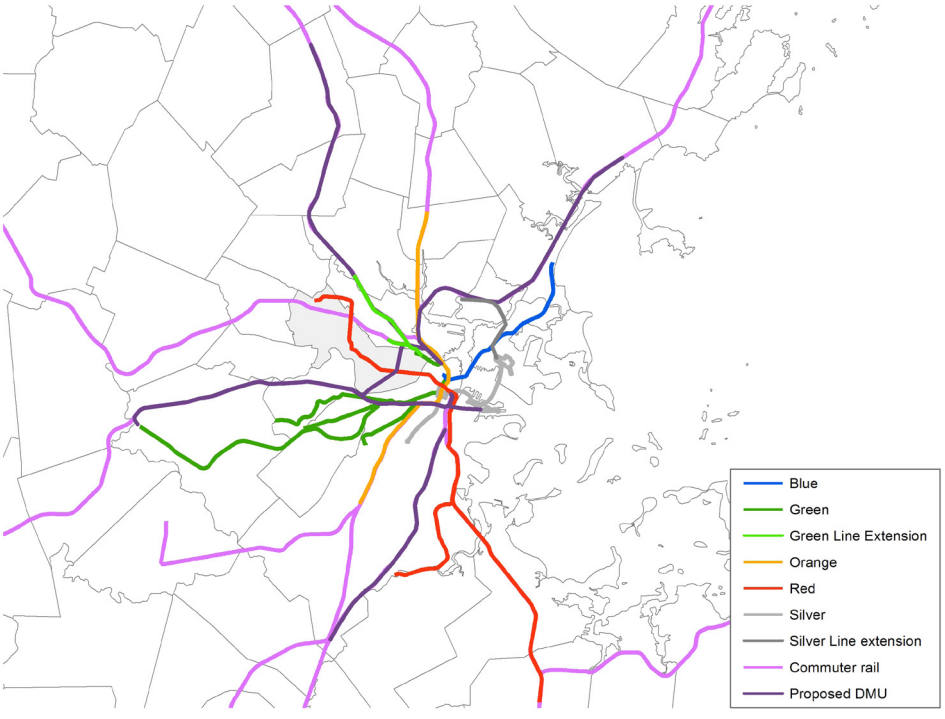


Figure 4. Vision for the MBTA in 2024, adapted from FY2014-FY2018 MassDOT Capital Investment Plan.[13]

Sustainable Mobility in Cambridge

High quality public transportation is critical for Cambridge to address our sustainability goals of economic viability, livability and equitability, and reduced environmental footprint.

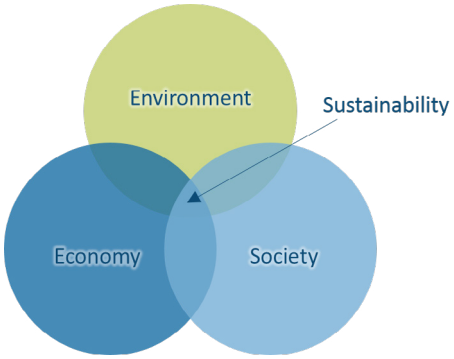


Figure 5. Triple bottom line sustainability.

Environment, economy, and society are generally considered the three overlapping and interactive components of sustainability. The relevance of transit in these areas is discussed in more detail below. In general, transit should support economic development, contribute to societal goals such as livability and equitability, and reduce our environmental footprint.

Economic Development

Significant investment in transit is critical to the future of economic growth in Cambridge and the region.

In Cambridge, economic development near transit has not necessarily led to increased automobile usage. For example, the additional four million square feet of mixed-use development in Kendall Square over the past decade has provided a significant increase in jobs and housing without an increase in automobile traffic. This is enabled by the proximity to transit and in part a result of Cambridge's Parking and Transportation Demand Management (PTDM) ordinance, which requires that developers provide incentives for the use of sustainable modes of transportation. In Cambridge as a whole, the total amount of commercial real estate has doubled in the past 20 years, an expansion that has not been matched by investment in transit.

A 2007 study assessed future scenarios for transit funding in the Chicago region and found that increasing investment in public transportation by $2.4 billion per year would lead to regional economic growth of about $3.9 billion per year and add 22,000 jobs.[14]

Of the $7 billion in development investment currently planned for transit-connected areas in Greater Boston's Urban Core[15], $2 billion is planned for Cambridge, focused on the NorthPoint and Kendall Square areas, which are very accessible by transit. Despite our successes in transportation demand management so far, and because of the general shift towards non-automobile modes, our transit capacity in these areas has been and will increasingly be strained.

A good public transit system is also vital to the tourism industry, an important component of the economies of Cambridge and Boston.

Figure 6. Rendering of Western Avenue reconstruction.

Good transit networks are also well-paired with good walking and biking networks: streets in Cambridge are designed to encourage walking with short blocks, frequent and well-marked crosswalks, and traffic signal timing that favors pedestrians. European-style bicycle lanes that are separated from traffic are a focus for creating more low-stress bicycling environments.

Livability and Equitability

Transit oriented development and places that are designed to have good access to transit contribute to a more livable and equitable environment overall. In addition, transit usage has health benefits and provides mobility for all incomes and ability levels.

Cities with good transit networks have vibrant urban spaces including denser, mixed land uses and less space needed for driving and parking automobiles (see Figure 7). This is closely intertwined with promoting walking and biking: transit supports a good walking and biking environment while walking and biking networks also provide important access to transit. Out of these sustainable modes, transit in particular can serve longer trips and has specific effects on the urban environment and behavioral shift away from automobile use.

People who live within access to transit tend to have lower car

Figure 7. Space consumed by the same number of people in single occupancy vehicles, one bus, or on bicycles.[16]

Car ownership has been declining in Cambridge over the last decade, in large part because the availability of car sharing services provides households with access to an extra car when needed. 41 percent of households in Cambridge who rent don't have a car,[17] and 81 percent of all households in Cambridge have one or no cars available.[18]

ownership. A reduced number of cars per household tends to lead to reduced car use (residents with access to good public transportation tend to drive 20 to 40 percent fewer annual miles) and driving may cease to be the habitual choice for every trip.[19]

Transportation is the second largest expense for most households after housing. On average, Cambridge residents spend 32 percent of their income on housing and 10 percent on transportation. The cost savings from going car-free can be substantial[20], and money saved can be put towards other things that increase quality of life. Transit oriented environments can also help save on transportation costs because housing is located closer to

Cambridge has a high live-work population—about half of all employed residents of Cambridge also work in Cambridge[21]—which means that, in general, commute distances are shorter and more likely to be completed by walking, biking, or using public transit.

employment, shopping, restaurants and other amenities.[22]

Transportation choices also have significant health impacts. A testament to the link between transportation and health, the Cambridge Public Health Department's Community Health Improvement Plan has the objective of "increas[ing] Cambridge residents' and employees' usage of active and sustainable transportation modes."[23]

Air pollution from automobiles is linked with leukemia, lung cancer, heart disease, respiratory illness, and premature death.[24] By encouraging public transit use, walking, and biking, we can reduce air pollution

"Access to safe, affordable transportation options is an essential social determinant of health"[25]

by reducing vehicle miles traveled and traffic congestion.

Public transit users tend to be more active—they take an average of 30 percent more steps per day and are more likely to meet the minimum daily recommended targets for walking[26] (see Figure 8), decreasing the likelihood of pervasive chronic conditions such as diabetes, heart disease, and obesity. As more and more people switch from driving to transit, walking, and biking, more and more road space can be devoted to these modes, making these sustainable—and active—modes more feasible and comfortable and increasing physical activity in the general public.

Public transit connects residents without easy access to other modes of transportation to additional resources to improve health: grocery stores and farmers markets, parks and community centers, schools with physical education, economic opportunities, and health care providers within Cambridge and in nearby communities.[27] Compact, walkable communities with good access to public transit are also

Figure 8. Public transit gets people moving.[28]

communities with the potential for improved community cohesion and social connections, which can improve physical and mental health.

Better infrastructure for walking, biking, and public transit reduces injuries and fatalities due to traffic accidents.[29] Traffic fatality rates for transit users are one-tenth of the fatality rates for motorists.[30] Many users find public transportation to be less stressful than driving.[31]

Providing mobility for our most vulnerable populations is of utmost importance. Persons with disabilities, elderly, low-income, and students are often particularly reliant on transit. Low income communities and communities of color are disproportionately burdened by a lack of safe, healthy, and convenient transportation options.[32] Nationally, 65 percent of families below the poverty line do not own a car[33] and would benefit from increased access to high quality, affordable public transportation. Almost all seniors who participated in community focus groups conducted by the AARP highlighted the importance of public transportation.[34] Children of color are more likely to be exposed to air pollution and develop asthma, and the pedestrian fatality rate is more than 80 percent higher than the national average in low-income communities.[35]

Reduced Environmental Footprint

The transportation sector directly accounts for almost one-third of all greenhouse gas emissions in the US.[36] In Cambridge, it accounts for a smaller amount, closer to 12 percent,[37] at least in part because of the already relatively high shares of sustainable modes of transportation. Still, transportation in Cambridge has a significant effect on the environment.

Reducing greenhouse gas emissions from transportation requires a broad range of strategies, including increasing vehicle efficiency, lowering the carbon content of fuels, and reducing vehicle miles of travel. Public transportation is an important component of the solution.

Switching to public transportation is one of the most effective actions

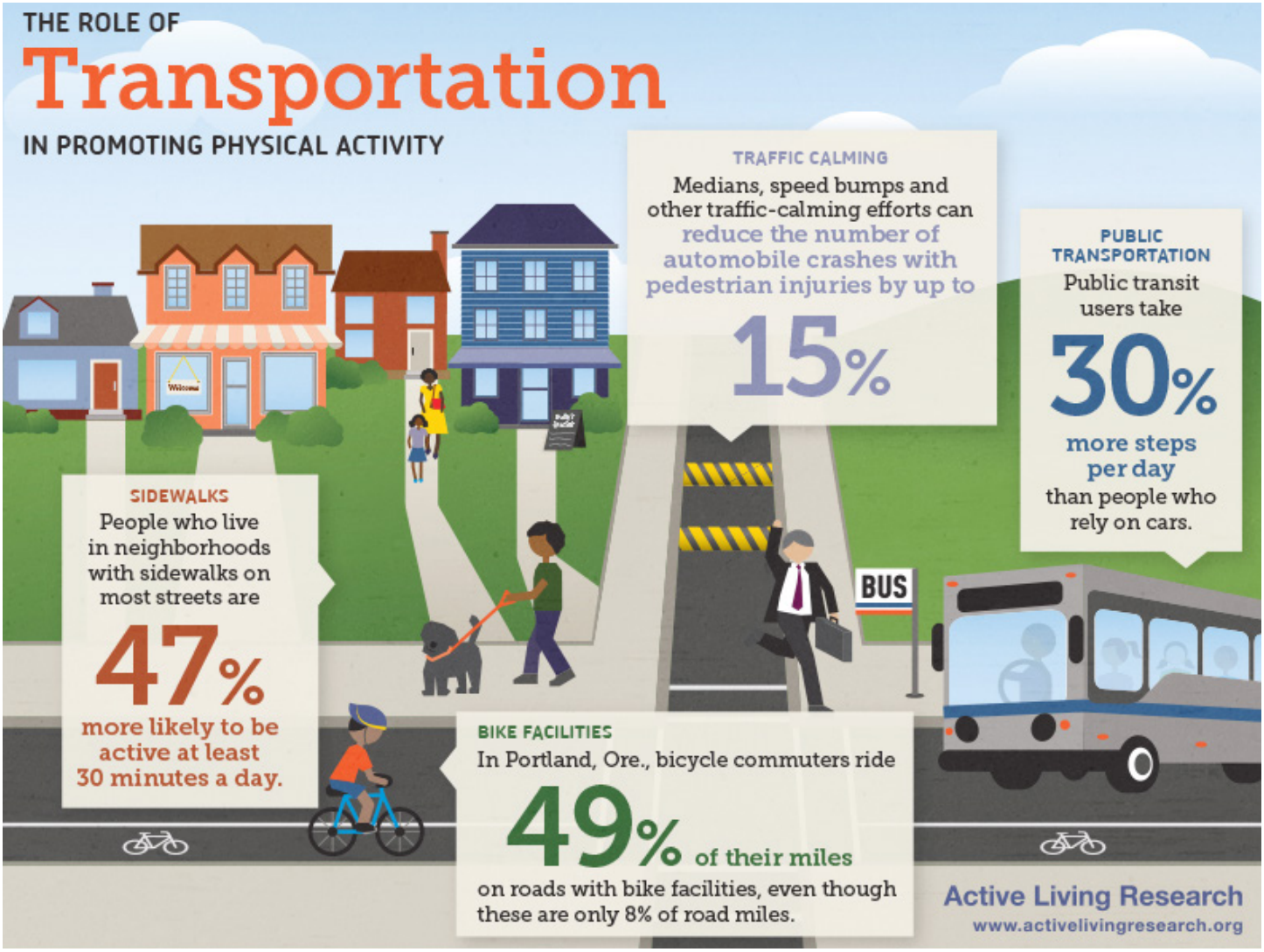


Figure 9. The role of transportation in promoting physical activity.[38]

individuals can take to reduce their carbon footprint. Taking transit instead of driving for a daily commute of ten miles each way reduces one's carbon footprint by eight percent.[39] Transit vehicles still have an environmental footprint, but the MBTA is committed to procuring buses with cleaner emissions and obtaining power from cleaner sources.[40]

Public transportation further reduces emissions by facilitating higher density development, which conserves land and decreases the distances people need to travel to reach destinations. In many cases, higher density development would be more difficult without the existence of public transportation because more land would need to be devoted to parking and travel lanes.

Even if we were able to achieve significant emissions reductions going forward, some degree of climate change is unavoidable given the existing buildup of greenhouse gases in the atmosphere, and this must be taken into account in planning and designing transit systems.[41] Impacts of climate change on New England include flooding due to intense rainfall (see Figure 10), rising sea levels and storm surges, heat waves (see Figure 11), and heavy snowfall, all of which will affect public transit from the perspective of operations, maintenance, passenger comfort, and other factors.[42] The City of Cambridge completed a climate change vulnerability assessment in 2015, which will serve as the foundation for a climate change preparedness and resilience plan.

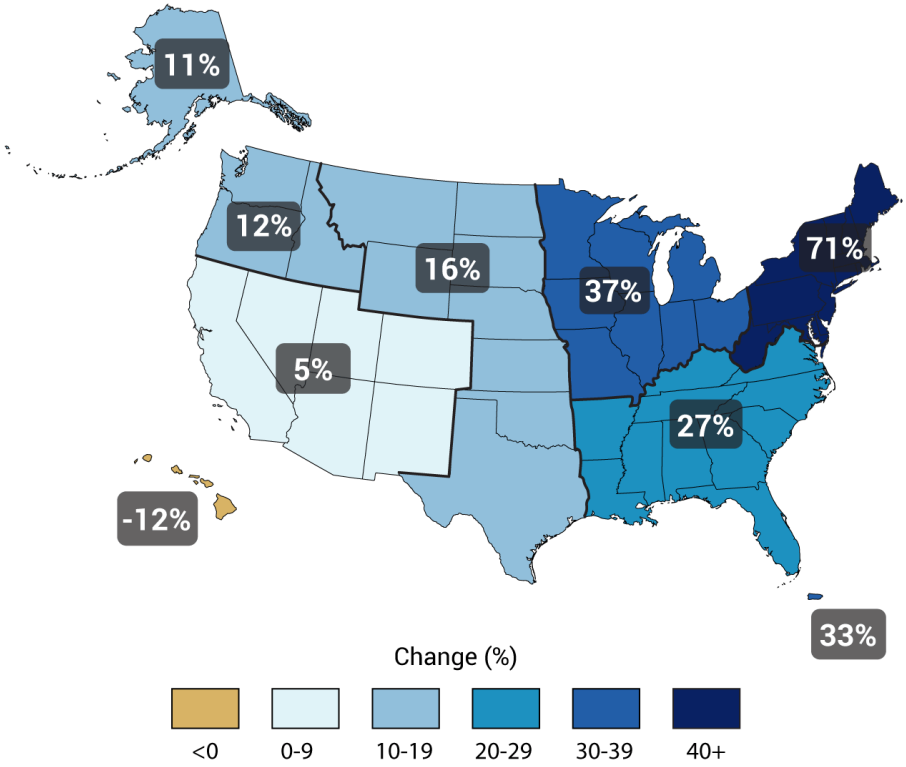


Figure 10. Observed change in very heavy precipitation. The map shows percent increases in the amount of precipitation falling in very heavy events (defined as the heaviest 1% of all daily events) from 1958 to 2012 for each region of the continental United States.[43,44]

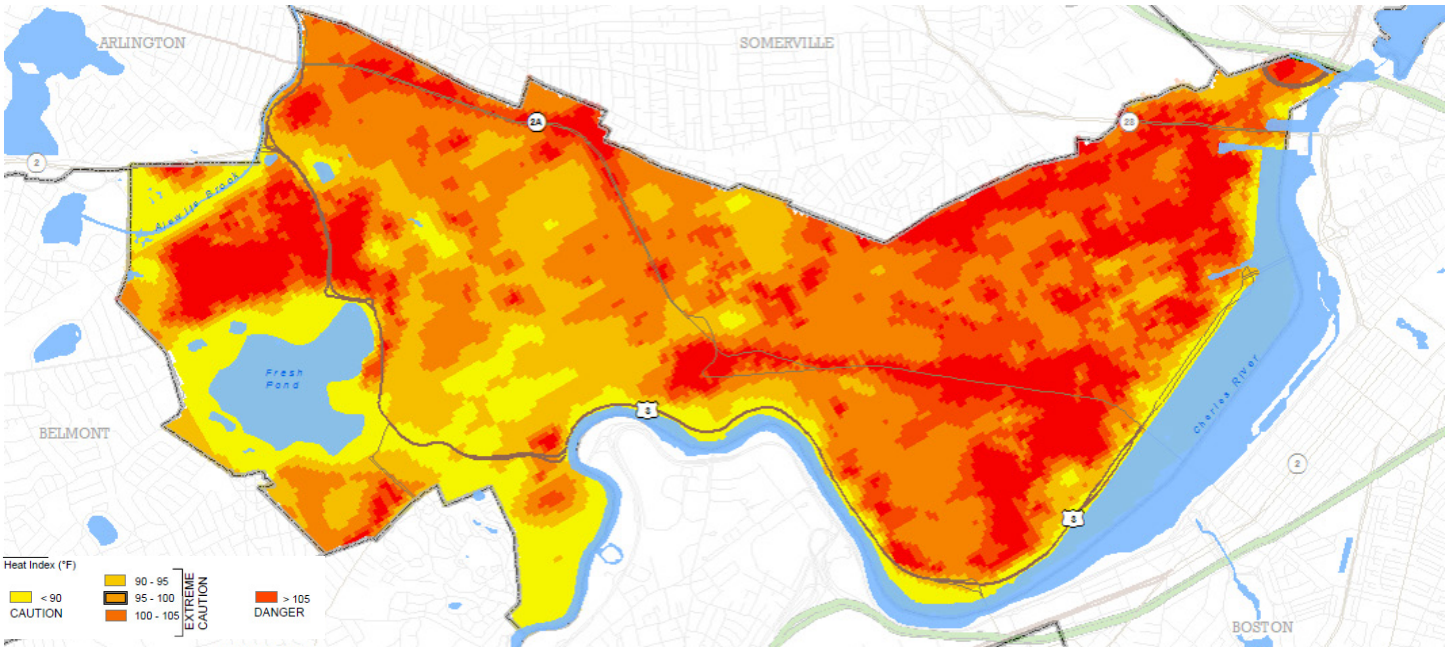


Figure 11. Projected heat map of Cambridge in 2030 after four consecutive days with heat index at 96 degrees F.[45]

Heat Index – 2030s scenario, for social environment. "Feels-like" temperature variability on a day when heat index is 96 degrees F (90 degrees F with relative humidity 50-55 percent)

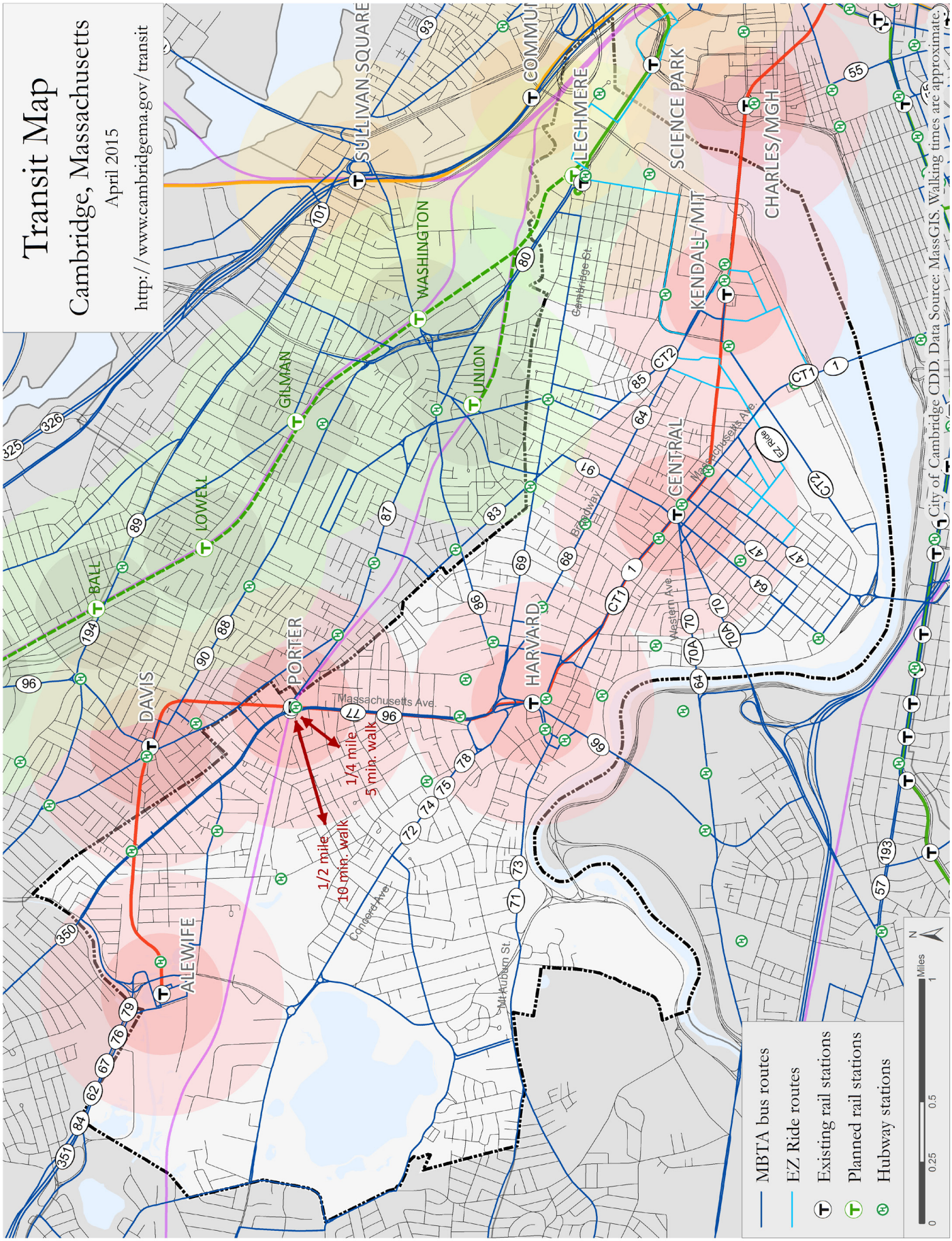


Figure 12. Transit service in Cambridge.

Transit in Cambridge

"A competitive economy, a healthy public, a healthy environment, and our quality of life in the Commonwealth depend upon a functioning and financially stable transportation system."

— Cambridge City Council, Policy Order Resolution, 2012[46]

Cambridge is served by multiple transit modes, including subway, light rail, commuter rail, buses, and Hubway (see Figure 12). A quarter of a million daily transit trips start or end in Cambridge (see Figure 13). About 25 percent of people who live or work in Cambridge rely on transit (see Figure 14). Many more use transit as a secondary means to get to work and use it regularly for non-commuting purposes. By comparison, only six percent of those who live or work in the greater Boston area rely on transit.[47]

A notable gap in transit service in and through Cambridge is the corridor from Sullivan to Kendall and to Longwood Medical Area. It should be prioritized to ensure interconnectivity between business districts and access to jobs. Figure 15 shows the estimated percentage of people working in Kendall Square who travel from each region or city. The proposed Urban Ring circumferential bus rapid transit project would serve this corridor with an expected 13,000 passengers getting on this service at Kendall Square every day.

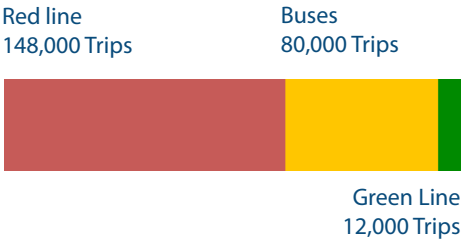


Figure 13. Transit trips starting or ending in Cambridge.

Red Line

The MBTA Red Line carries 217,000 riders per typical weekday, with 150,000 of them starting or ending their trip at one of Cambridge's five stops.[48]

Between 2008 and 2013, ridership on the Red Line increased about 19 percent.[49] Ridership on the system as a whole hit a record high in 2014 of 400.8 million trips.[50] The continued growth in ridership is certainly welcome, but it is also increasing strain on the system.

Running perfectly, the Red Line has the theoretical capacity to handle present-day demand. Figure 16 shows that on average over the peak hour, each train leaves Central Square station with 600 passengers. The maximum capacity of each train is 1000 passengers, including those who must stand. Yet, there is often such overcrowding that people are left behind on the platform. This is the result of persistent vehicle and track switching system breakdowns causing significant delays. Boston-bound trains during morning rush hour experience the worst overcrowding of trains in Cambridge.

Red Line trains are scheduled to come exactly four and a half minutes apart during rush hour. However, Figure 17 shows that only approximately 43 percent of Red Line trains are on time, where a train arriving three to six minutes after the last train is considered "on time." 15 percent are considered late, arriving between six and nine minutes after the last train, and seven percent are considered very late, arriving more than nine minutes after the last train (two times the scheduled headway of four and a half minutes). The remaining 35 percent arrive early, only zero to three minutes after the last train. This is often referred to as "bunching," which means the following or "early" train is either picking up passengers left behind or simply running empty.

All of the Red and Orange Line trains have exceeded their useful lifespan or require significant overhaul. On some mornings, the MBTA does not operate with the maximum number of train-sets possible. The MBTA is acquiring new cars to replace some of the oldest ones in the fleet, but the new cars are not projected to be fully rolled out until 2021.[51]

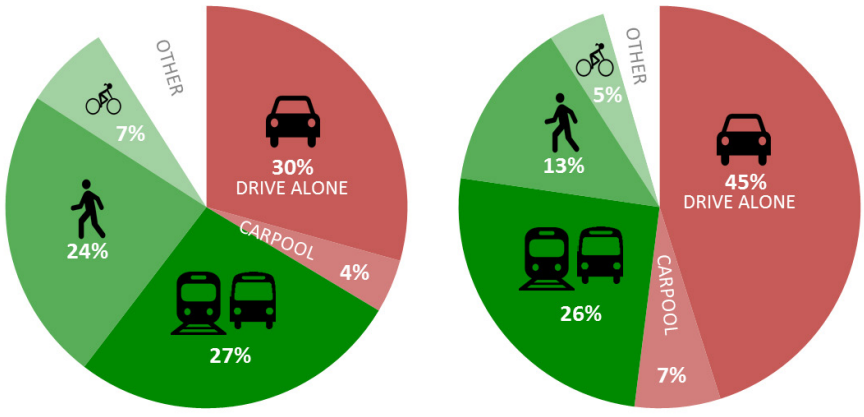


Figure 14. 2013 Cambridge mode share.[52]

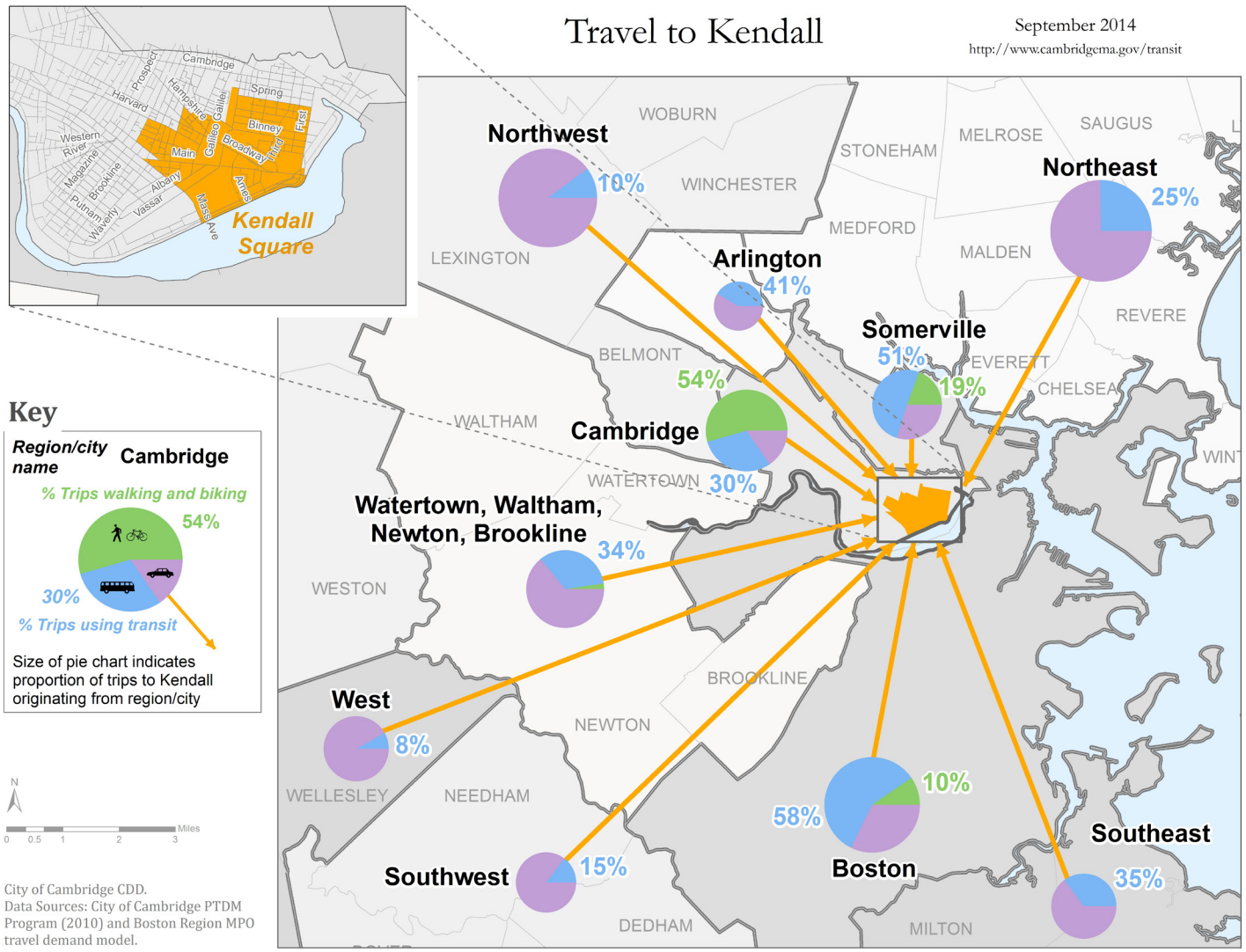


Figure 15. Travel to Kendall.

Table to right lists the percentage of trips to Kendall Square originating from each region (e.g., "Northeast") or city (e.g., "Somerville") as indicated on the map. Percentages are also represented on the map by the size of the pie charts in each region. Pie charts also indicate the mode share from that region, with walking and biking shares shown in green, transit shares shown in blue, and driving shares shown in purple.

Region/City	Percentage of trips to Kendall originating from region/city
Northeast	17%
Somerville	8%
Arlington	4%
Northwest	16%
Cambridge	11%
Watertown, Waltham, Newton, Brookline	10%
West	7%
Southwest	6%
Boston	15%
Southeast	7%

Even if these issues were fixed and the Red Line system were operating at peak capacity, it could not meet the mobility needs from the planned growth that is expected in Cambridge and our region over the next 30 years.

Therefore, increased capacity is needed either by increasing the capacity of the Red Line or by adding new subway or bus service. A modern "Communications-Based Train Control" system has the potential to double the capacity of the Red Line by allowing trains to come twice as frequently, as has been successfully implemented in London. In addition, new trains that allow passage between cars allow for a better distribution of passengers during peak time, as in several European metro systems.

Green Line

On a typical weekday, about 12,000 passengers get on or off the Green Line at its current terminus at Lechmere Station. Trains run every six minutes during rush hour.

The Green Line is undergoing significant change with the construction of the Green Line Extension, which will allow trains to continue from Lechmere station to Union Square in Somerville and to Medford, resulting in an additional 9,000 people getting on or off at Lechmere Station.[53] This project involves constructing a modern Lechmere station at the new location, which will continue to serve NorthPoint and East Cambridge. Monsignor O'Brien highway near the new station will also be modified. The multi-modal Community Path will be constructed parallel to the Green Line Extension and could connect to a similarly proposed path along the Grand Junction right-of-way.

Buses

32 bus routes pick up or drop off 80,000 riders in Cambridge per typical weekday[54] (see Figure 18). Of the fifteen bus routes with highest ridership in the entire MBTA system, four of them are in Cambridge (routes 1, 66, 73 and 77).[55]

18 of the bus routes operating in Cambridge fail the MBTA's "vehicle load standard," meaning there is excessive crowding during peak times.[56]

The MBTA is completing implementation of the Key Bus Route Improvement Program, which includes routes 1, 66, 71, 73, and 77 in Cambridge. The program improves bus service reliability and reduces overall trip times by consolidating stops. It also provides better passenger amenities at stops such as shelters, benches, signage, and trash barrels.

There are a variety of other non-MBTA bus shuttle services in Cambridge.

The Charles River Transportation Management Association (TMA) operates the EZRide Shuttle, which helps to connect transit and worksites for commuters to Kendall Square, East Cambridge, MIT, and Cambridgeport. Launched in 2002, the EZRide now carries over 500,000 passengers per year.[57]

The Alewife TMA, TransAction Associates, and 128 Business Council run shuttles in the Alewife

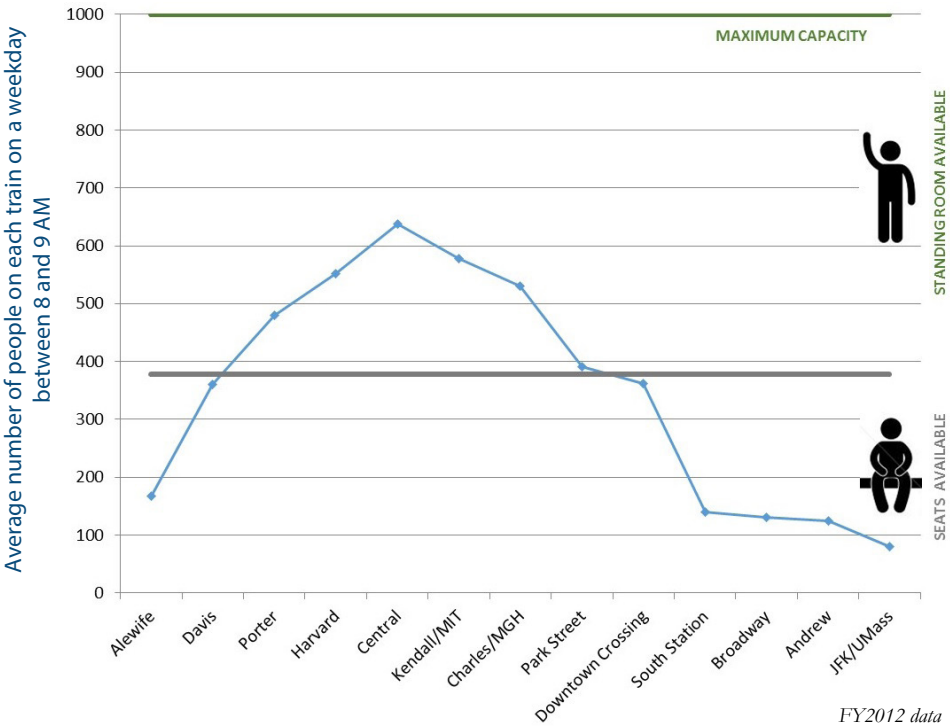


Figure 16. AM Red Line load toward Ashmont/Braintree.

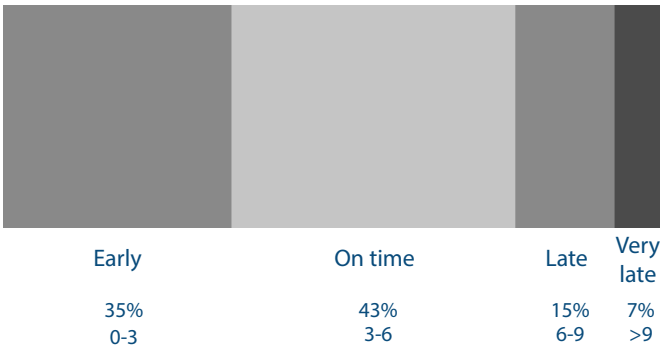


Figure 17. Red Line train delays.

Central Square station, April 2013, weekday PM peak, outbound.

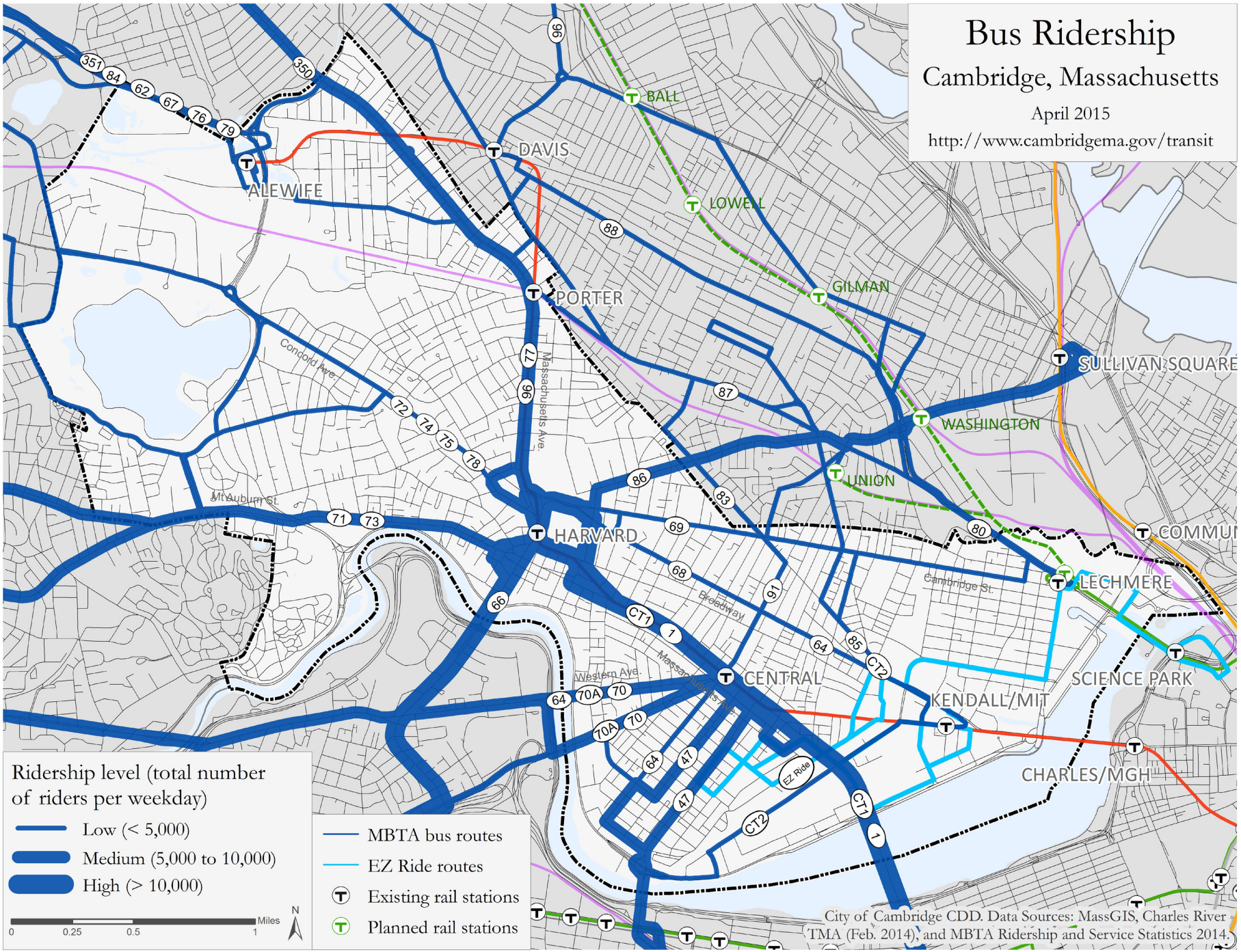


Figure 18. Bus routes and ridership.

station area and out to Lexington and Waltham.

Cambridge is also served by the M2 shuttle, which is run by the Medical Academic and Scientific Community Organization (MASCO), and is open to the public for a fee.

Harvard University and the Massachusetts Institute of Technology, as well as other universities and institutions in and around Cambridge, run private shuttles to key locations.

Given the fiscal reality that funding is currently not available for new subway lines beyond the Green Line Extension, MassDOT and municipalities must consider low-cost transit improvements that increase capacity in the short term.

For example, extending existing bus routes, such as from Central Square to Kendall Square, could be explored as a way to relieve congestion on the Red Line at relatively low cost. Prioritization of buses can also be achieved by strategically adding queue-jump priority lanes and implementing traffic signals that prioritize buses. These approaches would help improve travel times by bus (see Figure 21 for relative speeds of buses through Cambridge).

One of the limiting factors to significantly increase peak bus service is the need for constructing additional bus garages to house additions to the fleet.

Hubway

Hubway is a public transportation system by bike, which is owned by the municipalities of Cambridge, Boston, Brookline, and Somerville. It has almost 13,000 members, 140 stations, and users have made almost three million trips since the system launched in 2011. There are Hubway stations at all subway stations in Cambridge, as well as at other bus and transportation hubs, and in neighborhoods as well, making it easy to transfer between Hubway and other public transit modes.

Commuter Rail

Cambridge is served at Porter Square by the Fitchburg/South Acton commuter rail line, which continues downtown from Porter Square to North Station. The feasibility of a new commuter rail station at Alewife is being studied, which would also link the Alewife Quadrangle and Alewife Triangle together for pedestrian and bicycle trips.

Diesel multiple units (DMUs) are currently being evaluated for use along existing commuter rail lines, as well as potentially along the Grand Junction right-of-way.

Figure 19. Hubway station in Harvard Square.

Figure 20. Commuter rail train at Porter Station.[58]

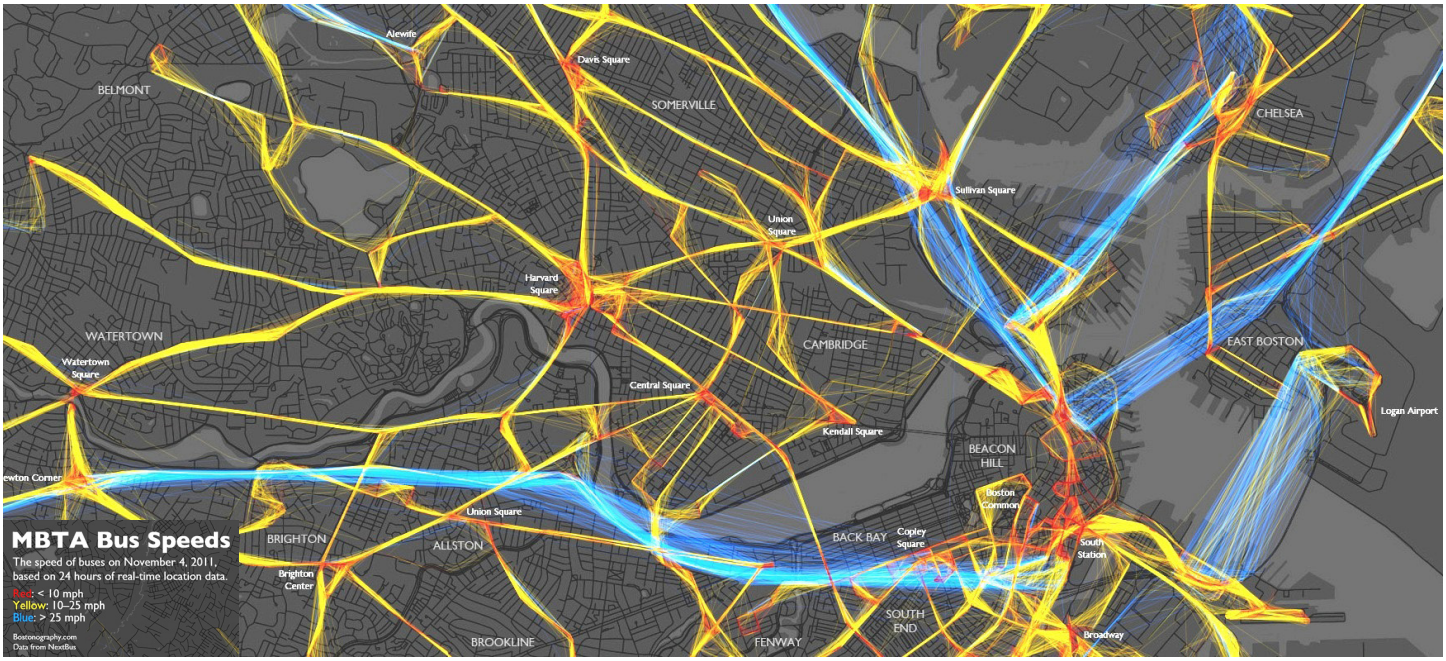


Figure 21. Average speed of MBTA buses.[59]

Policies and Programs

"For too long, federal policy has actually encouraged sprawl, congestion and pollution, rather than quality public transportation and smart, sustainable development. We've been keeping communities isolated when we should have been bringing them together." — President Barack Obama, 2009

High quality public transit is a cornerstone of many important policies and programs at the local, regional, state, and national level (for a partial list, see Appendix).

In Cambridge, public transit plays a key role in the implementation of the following policies:

Vehicle Trip Reduction Ordinance, *1992*	Make more efficient use of mass transit, bicycling, walking, and other alternatives to drive-alone trips.
Growth Policy Document, *1993 and 2007*	Undertake reasonable measures to improve the functioning of the city's street network, without increasing through capacity, to reduce congestion and noise and facilitate bus and other non-automobile circulation.
Parking and Transportation Demand Management Ordinance, *1998*	Reduce vehicle trips and traffic congestion within the City, thereby promoting public health, safety, and welfare and protecting the environment.
Draft Roadmap, Cambridge Climate Protection Action Committee, *2013*	Reduce vehicle miles traveled by vehicles registered in Cambridge to 5 percent below 2010 levels by 2020.
Community Compact for a Sustainable Future, *2013*[60]	"Leveraging the intellectual and entrepreneurial capacity of the business, non-profit, education, and municipal sectors in Cambridge to contribute to a healthy, livable and sustainable future."
Department of Public Works 5-Year Plan	Reconstruct streets and sidewalks with an emphasis on a Complete Streets approach: designing streets for all users.
Cambridge in Motion, Cambridge Public Health Department[61]	Activities include "increasing opportunities for physical activity in communities and workplaces by joining the Hubway bike share program" and "using a 'Complete Streets' approach to create streets that work well for all modes of travel, including walking and bicycling."
Cambridge Food and Fitness Policy Council, Cambridge Public Health Department[62]	Policy roadmap includes continuing to "strengthen opportunities for physical activity including alternative and active transportation."
Cambridge Community Health Improvement Plan, *2015*[63]	"Advocate for improved transit infrastructure and funding, including increased system capacity (commuter rail, Green Line extension, increased Red Line frequency, new bus routes, increased shuttle services from hubs to businesses), and system improvements (increased number of clean air buses, priority bus lanes and signaling, and transit facilities such as bus shelters and wayfinding signage)."

Figure 22. Harvard Square.[1]

Strategic Plan Goals and Objectives

"The future success of Cambridge hinges on better public transportation. High quality transit, biking, and walking options make cities far better places to live and work." — *Richard C. Rossi, Cambridge City Manager*

As part of the strategic planning process, seven overarching goals and accompanying objectives were defined to help guide the City's role in improving transit based on the context discussed in earlier sections of this report. The goals and objectives were based on input from the internal interdepartmental working group and the Transit Advisory Committee. The goals and objectives represent the outcomes that the City wishes to see result from our efforts.

This section also contains a summary of activities and programs the City has completed or in which the City is currently engaged related to each goal.

Figure 23. Central Square.

Goal 1

Maximize Transit's Ability to Serve All Trips

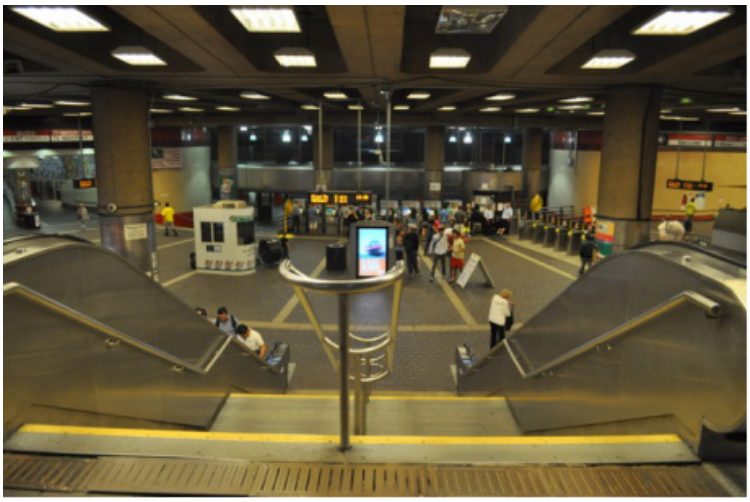
Our future transit needs resulting from regional growth and development, as well as changing demographics, must be understood. Based on this understanding, we must ensure that the transit system provides for the mobility needs of Cambridge residents, employees and visitors, including trips to work, school, shopping, and recreation, within Cambridge and the greater region.

Objectives

1. Study existing and future mobility needs and gaps where all users' needs are not met
2. Prioritize transit investments in routes that have high ridership or potential for higher ridership
3. Prioritize transit investments that improve mobility for those most dependent on transit
4. Prioritize transit investments that increase access to community amenities and resources
5. Prioritize transit projects that support transit oriented development

Highlighted Activities

- The City completed the Healthy Aging and Public Transportation Study in 2014
- The City has been visualizing the existing transit system through map overlays
- Projections of future transit demand were developed through the Kendall Square / Central Square planning process



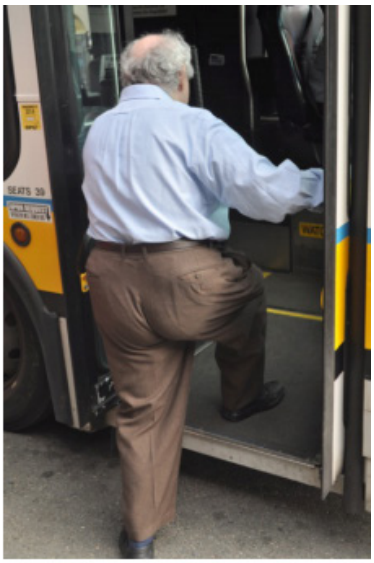


Figure 24. Image from *User/Expert Field Analysis of Public Transit in Cambridge, Massachusetts*, part of the Healthy Aging and Public Transportation Study.

Goal 2

Increase and Prioritize Transit Funding

Ensure that our transit system is adequately funded, affordable, and serves the regional common good.

Objectives

1. Allocate more available municipal funds towards transit improvements
2. Educate the public about the importance of supporting statewide and regional transit funding strategies
3. Form or participate in a transit funding coalition among municipalities and with private business
4. Increase developer contributions for improving transit
5. Coordinate with the MBTA, MassDOT, and other agencies and transit groups to support additional funding sources for transit
6. Support increased private sector funding for Transportation Management Associations (TMA) for transit services

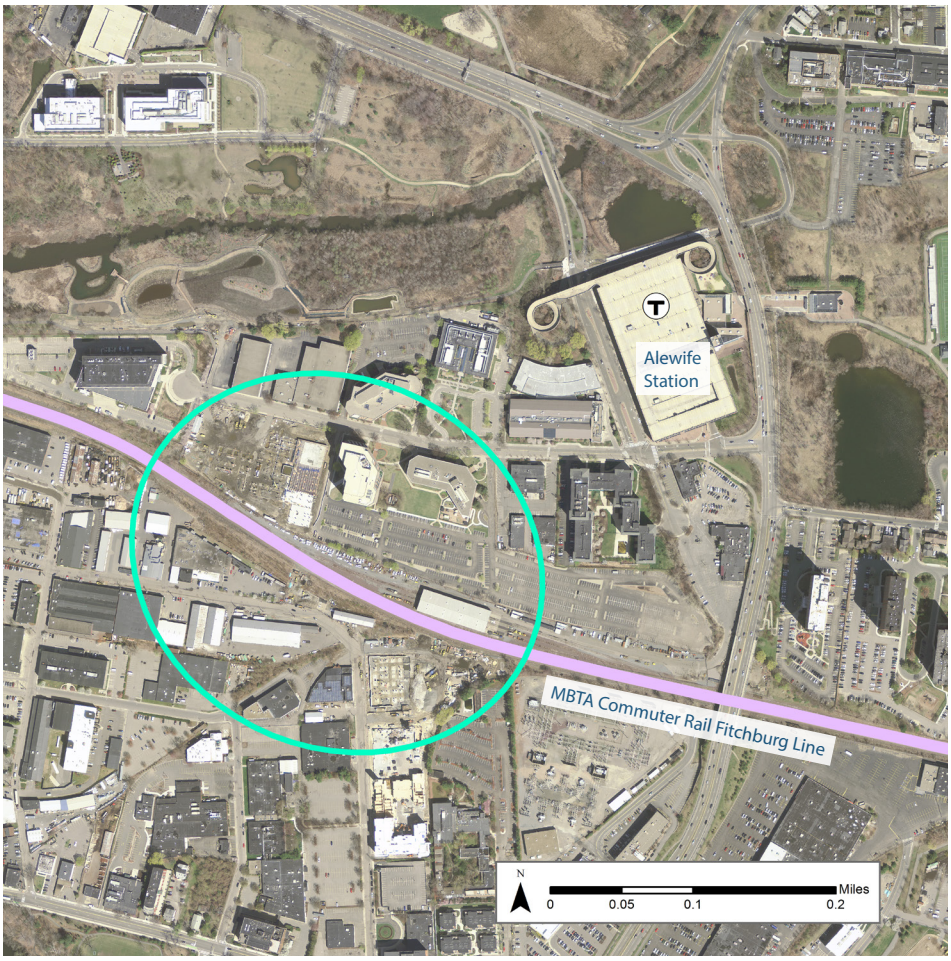


Figure 25. Proposed Alewife commuter rail station and bicycle/pedestrian bridge study area.

Highlighted Activities

- The City is currently collaborating with regional transportation stakeholders on transit projects and issues (such as through the BRT study group, Green Line Extension interim offsets, and the Urban Ring)
- The City is engaging with MassDOT in collaborative regional transit planning (Kendall Square Mobility Task Force)
- The City helped establish and contributes funds annually to the Charles River TMA
- The City obtained over $500,000 from development projects in the Alewife area towards the planning and design of a proposed new commuter rail station and bicycle/pedestrian bridge at Alewife. Project requirements also played a role in the formation and membership of the new Alewife TMA
- The City obtained and allocated $100,000 of funding towards two studies assessing bus service and proposing improvements (Transit Service Analysis and Central Square Bus Access and Circulation Study)

Goal 3

Increase Efficiency and Reliability of Transit Services

Reduce travel times for sustainable modes of transportation, including transit. Improve efficiency of transit trips such that travel times are equal to or less than equivalent driving times. Our transit system needs to be more dependable and reliable.

Objectives

1. Coordinate with the MBTA to improve Red Line capacity, efficiency, and reliability, and/or provide supplemental transit service. Coordination should include review and comment on MBTA designs and guidelines
2. Analyze and improve bus circulation, travel time, and reliability through priority treatments at targeted locations
3. Incorporate transit improvements into all City projects when reconstructing or redesigning roadways, sidewalks, and intersections
4. Prioritize transit and other sustainable modes over driving when allocating public space and signal time on roadways, leading to greater transit efficiency
5. Coordinate with the MBTA and private shuttles to advocate for increased bus and commuter rail efficiency and reliability
6. Foster collaboration between public and private agencies to provide coordinated service and share common technologies
7. Support improvements in fare payment policy, strategies, and technology

Highlighted Activities

- The City collaborates with the MBTA on its "Key Bus Routes" improvement program and other coordination efforts to improve bus frequency and reliability, including setting stop lines and on-street parking back from intersections so buses can make turns, lengthening bus stops, and consolidating bus stops
- The City has completed the Transit Service Analysis, assessing service of Key Bus Routes and Route 69 in Cambridge to identify problem areas and propose initial ideas for transit priority treatments
- The City is conducting the Central Square Bus Access and Circulation Study
- The City has participated in regular coordination meetings with the MBTA for over 10 years to improve bus service as well as station signage, bike parking and cleanliness

Figure 26. Delay and unreliability along Route 73 on Mt Auburn St in the AM peak, from *Transit Service Analysis* report, 2014. Green roadway segments indicate less delay and unreliability, while yellow, orange, and red roadway segments indicate increasingly higher amounts of delay and unreliability.

Goal 4

Expand Transit Service

Expand the capacity of rapid transit and bus service by increasing frequency, extending existing routes, and adding new routes.

Objectives

1. Support and advocate for new cross-town services, especially in the Sullivan Square-Kendall Square-Longwood Medical Area corridor, in the form of bus rapid transit or other improved transit lines
2. Support and advocate for increases in span of service within the MBTA system (including commuter rail, rapid transit, and bus)
3. Support and advocate for new bus service in underserved, transit dependent, low income, and minority neighborhoods
4. Support and advocate for existing and new Transportation Management Associations (TMAs) to supplement existing transit service
5. Support and advocate for service where users are experiencing last mile (or longer) problems

Highlighted Activities

- The City has long advocated for cross-town service (most specifically from Sullivan to Kendall and beyond) through different modes and efforts
- The City works with MBTA on adjusting routes per their bus service plan, increasing bus frequency (e.g., in 2010, in part because of City input, the MBTA added a new morning peak hour bus to route 47 and made some schedule timing adjustments to address growing ridership)
- The City will participate in the new Kendall Square Mobility Task Force launched by MassDOT, which will work to identify projects and policy initiatives in support of the continued success of Kendall that are technically and financially achievable
- Late night service by MBTA was implemented and is being evaluated
- The City has participated in Green Line Extension planning and implementation

Figure 27. Renderings of new Lechmere station as part of Green Line Extension and bike parking at station, MassDOT.[64]

Goal 5

Improve Usability, Accessibility, and Safety

Improve system access for all users by emphasizing interconnectivity between transit and other modes (e.g., walking and biking), as well as accessibility for persons with disabilities or mobility impairments. Safety, convenience, human-centered design, good wayfinding, and real-time service information are important elements of a world-class transit system.

Objectives

1. Streamline transfers between transit modes to minimize walking times
2. Improve wayfinding and information for transit users, particularly related to transfers between transit modes and from transit to major landmarks/ destinations
3. Improve and encourage access to transit by other sustainable modes
4. Maximize connections between Hubway, a newer transit system by bike, and traditional bus/subway transit
5. Maintain and improve bus stop and subway station amenities and access
6. Improve visibility of transit stops through placement, amenities, and branding
7. Reduce bus conflicts with other users of the streets and sidewalk
8. Improve winter maintenance, especially snow clearing, near transit stations, bus stops and Hubway stations
9. Provide lighting, visibility and security at bus stops and transit stations

Figure 28. Cemusa shelter on Concord Avenue at Callanan Playground.

Highlighted Activities

- The City has completed Healthy Aging and Public Transportation study funded by a Mass in Motion grant
- The City has encouraged or required real-time TransitScreens on private property
- The City installed TransitScreens with real-time information at three pilot locations in Cambridge (Senior Center, Public Library, and City Hall) and plans to install more
- The City advocated for MassDOT to complete the Alewife Greenway extension connecting Alewife and Brighton St at the border with Belmont
- The City has expanded its bus shelter program by adding 35 Cemusa shelters with an additional 15 planned
- The City has funded or worked with private developers and institutions to install Hubway bike share stations at all transit stations and near many key transit stations and bus stops
- The City has expanded and prioritized bus stop and sidewalk snow clearance

Goal 6

Improve Public Outreach and Participation

Engage the public in the planning process, better inform them about the issues facing the future of Cambridge, and gain support from the public for implementing better transit service. Use marketing with a focus on "social marketing" to achieve mode shift in many demographics across Cambridge.

Objectives

1. Increase outreach through a variety of methods to accomplish objectives included under other goals, such as increased usage of transit and other sustainable modes and supporting transit funding
2. Use effective, positive, attention-getting messaging and innovative ways of reaching out to the public
3. Target outreach to be more efficient, avoiding "communications fatigue", and resource effective by capitalizing key opportunities and integration into existing efforts
4. Obtain more feedback from the public to inform improvement of current transit systems
5. Communicate openly and frequently with other agencies, businesses, and organizations in the City and the region to promote more transit usage and improve transit service
6. Maintain a Transit Advisory Committee to advise the City on transit issues and prioritizing improvements

Highlighted Activities

- The City established the Transit Advisory Committee
- The City established the CitySmart social marketing program, which provides information on biking, walking, and taking transit around Cambridge
- The City is posting transit-related news and materials through the Cambridge Community Development Department social media accounts

Figure 29. CDD Twitter Account (left) and CitySmart logo (right).

Goal 7

Improve Resiliency to and Preparedness for Climate Change

Reduce transportation's contributions to climate change through increased transit use, which is also addressed in Goals 1 through 6. Ensure the transit system continues to reduce its GHG impact and is resilient to the effects of climate change.

Objectives

1. Coordinate with state agencies on upcoming and ongoing vulnerability assessments and resiliency projects
2. Coordinate with other municipalities and agencies in developing a regionally appropriate evacuation plan for Cambridge, paying particular attention to transit's role in evacuation and the effect on vulnerable populations
3. Support improved transit vehicle technology that has less environmental impact as well as energy efficiency and renewable energy generation at transit stations
4. Increase resiliency of City owned assets related to transit to the impact of heat and flooding
5. Reduce impact of stormwater and flooding at locations that affect transit by increasing capacity of drainage systems, clearing drains, and using more pervious materials
6. Improve amenities at transit stops and stations and along routes to transit to help address and mitigate issues related to extreme weather
7. Increase green space and coverage for shade to mitigate impacts of heat on transit riders

Highlighted Activities

- The City is participating in MassDOT and MBTA studies of system-wide vulnerabilities that will lead to a regional approach to increase resiliency
- The City is carrying out a Vulnerability Assessment to understand impacts of climate change on our transit system

Figure 30. "Raised-grate street sculptures to prevent subway flooding. Stormwater improvements have been made at chronic flood locations by integrating raised-grate street sculptures to prevent subway flooding within the MTA NYCT service area and also serve as street furniture and/or bike racks." Metropolitan Transportation Authority, New York City.[65]

Work Plan

This section identifies ongoing, short-term (within the next three years), and medium-to-longer-term (three to seven+ years) initiatives that can be pursued in an effort to meet the established goals and objectives.

Item	Description	Examples (if applicable)	Goal 1: Serve All Trips	Goal 2: Funding	Goal 3: Efficiency & Reliability	Goal 4: Expand	Goal 5: Usability/Accessibility/Safety	Goal 6: Outreach & Participation	Goal 7: Climate Change
Ongoing (current and continuing)									
A	Staff the Transit Advisory Committee, which is tasked with guiding Cambridge city positions and policies regarding transit funding, expansion, reliability, efficiency, design, and service planning							•	
B	Coordinate with the MBTA on service updates, infrastructure improvements, and long-range planning	Coordinate on infrastructure improvements (e.g., to Red Line portal at Longfellow) and participate in the Program for Mass Transportation (MassDOT's long-range capital planning document) process	•	•	•	•	•	•	•
C	Coordinate with regional and local organizations on funding transit improvements, providing transit service, and completing transit studies	Coordinate with existing Transportation Management Associations (TMAs) like Charles River TMA and Alewife TMA, on new TMA feasibility, and on studies such as the Central Transportation Planning Staff (CTPS) Core Capacity Constraints study	•	•	•	•	•	•	•
D	Improve bus stop amenities	Partner with Cemusa to provide bus shelters					•		•
E	Work with developers through permitting and the Parking and Transportation Demand Management (PTDM) program to obtain support for transit improvements	Require that some developers construct and maintain bus shelters	•	•			•	•	
F	Actively promote and share transit information online and through other communication methods to make it more accessible to the public	Post project updates, data, and maps on the CDD website	•				•	•	
G	Maintain and evaluate existing and additional publicly and privately owned real-time transit information displays	Install TransitScreens and other real-time transit information at bus stops					•	•	
H	Identify transit-related vulnerabilities to climate change and increase resiliency by making improvments and coordinating with MassDOT, the MBTA, and other groups	Complete Cambridge Climate Change Vulnerability Assessment and coordinate with MassDOT on statewide transportation vulnerability assessment							•
I	Conduct station condition surveys on a regular basis, make improvements based on observations, and evaluate change over time		•		•		•		•
J	Update Transit Strategic Plan at regular intervals, with minor updates possible at more frequent intervals	Overall update every five years; use work plan as a living document	•					•	
K	Continue to coordinate and improve coordination on winter maintenance at bus stops and subway stations	Continue to coordinate with DPW, Cemusa, and MBTA					•		
Short-term (0-3 years)									
L	Participate in and chair the MassDOT Kendall Square Mobility Task Force, and carry out additional analysis if needed		•		•		•		

Item	Description	Examples (if applicable)	Goal 1: Serve All Trips	Goal 2: Funding	Goal 3: Efficiency & Reliability	Goal 4: Expand	Goal 5: Usability/Accessibility/Safety	Goal 6: Outreach & Participation	Goal 7: Climate Change
M	Advance conceptual design of commuter rail station and bicycle/pedestrian bridge at Alewife			•		•	•		
N	Coordinate with MBTA on Green Line Extension project	Coordinate on interim and new bus routing related to the new Lechmere Station		•	•	•	•		
O	Coordinate with MassDOT and Boston on I-90/West Station design and access	Coordinate on bicycle, pedestrian, and transit connections to West Station		•	•	•	•		
P	Carry out a transit service gaps and needs study synthesizing input from various studies and engaging the public to create a longer term vision for transit service in the city		•	•	•	•	•	•	
Q	Advance study and design of transit needs and priority at intersections as part of other studies	Complete City of Cambridge Intersection Study, coordinate with the Department of Conservation and Recreation on Mt. Auburn Street and Fresh Pond Parkway study, and coordinate with MBTA on rerouting buses near Alewife station to improve operations			•				
R	Implement new bus stop design and bus priority treatments and evaluate results	Pilot transit priority lanes, pilot transit signal priority (TSP) at specific intersections, pilot a bike lane behind a bus stop			•		•		
S	Increase availability of passes for transit services, especially for different income and age groups	Participate in MBTA youth pass pilot and coordinate on selling MASCO M2 shuttle tickets at multiple locations in Cambridge	•				•		
T	Implement near- to intermediate-term recommendations from the Central Square Bus Access and Circulation Study	Improve wayfinding, reduce obstacles on sidewalks, and install more shelters			•		•		
U	Undertake visioning process for North Massachusetts Ave (between Porter Square and the Arlington border) with consideration for transit needs				•		•		
V	Develop regular public outreach about transit news	Distribute weekly "Transit Bulletin" electronic mailing		•				•	
Medium-to-longer term (3-7+ years)									
W	Improve transit access between Sullivan Station and Longwood Medical Area through Cambridge				•	•	•		
X	As opportunities arise, evaluate and potentially design and construct transit facilities in the Grand Junction multi-modal transportation corridor	As track repairs are made, coordinate on desired track alignment				•	•		
Y	Implement intermediate- to longer-term Central Square Bus Access and Circulation Study recommendations in coordination with the MBTA	Coordinate on and implement stop, layover, and routing changes			•	•	•		

Advisory Committee Meetings to Date

2013

May 8	Transit in Cambridge: strengths, weaknesses, opportunities, and threats
June 4	Transit and demographics data workshop
August 7	Preparing for climate change and data workshop
September 11	Transportation implications of Smart Growth
November 6	Triple bottom line sustainability, and discussion of strategic planning goals
December 4	Goal 5: Usability, Accessibility, and Safety

2014

January 8	Goal 3: Efficiency and Reliability
March 5	Goal 1: Mobility
April 2	Goal 4: Expansion
May 7	Goal 2: Funding
June 4	Goal 6: Public Participation, Support, and Outreach
August 13	Central Square Bus Study site walk
September 10	Central Square Bus Study and Transit Service Analysis
October 1	Goal 7: Resiliency
November 5	Draft objectives, Central Square Bus Study Task 2, Healthy Aging and Public Transit report
December 3	Central Square Bus Study Task 3, budget request update

2015

February 4	EZRide, budget request update, MBTA changes/performance
March 4	MBTA challenges, input for Gov. Baker's Special Panel, Central Square Bus Study
April 1	Green Line Extension and Lechmere Station, Transit Advisory Committee structure
May 6	Kendall Square Mobility Task Force, Gov. Baker's Special Panel Report
June 3	Red Line Capacity

Figure 31. CT1 bus crossing the Charles River into Cambridge.

Appendix: Policies and Programs

Key Cambridge Policies

Vehicle Trip Reduction Ordinance, *1992*	Make more efficient use of mass transit, bicycling, walking, and other alternatives to drive-alone trips.
Growth Policy Document, *1993 and 2007*	Undertake reasonable measures to improve the functioning of the city's street network, without increasing through capacity, to reduce congestion and noise and facilitate bus and other non-automobile circulation.
Parking and Transportation Demand Management Ordinance, *1998*	Reduce vehicle trips and traffic congestion within the City, thereby promoting public health, safety, and welfare and protecting the environment.
Draft Roadmap, Cambridge Climate Protection Action Committee, *2013*	Reduce vehicle miles traveled by vehicles registered in Cambridge to 5 percent below 2010 levels by 2020.
Community Compact for a Sustainable Future, *2013*[66]	"Leveraging the intellectual and entrepreneurial capacity of the business, non-profit, education, and municipal sectors in Cambridge to contribute to a healthy, livable and sustainable future."
Department of Public Works 5-Year Plan	Reconstruct streets and sidewalks with an emphasis on a Complete Streets approach: designing streets for all users.
Cambridge in Motion, Cambridge Public Health Department[67]	Activities include "increasing opportunities for physical activity in communities and workplaces by joining the Hubway bike share program" and "using a 'Complete Streets' approach to create streets that work well for all modes of travel, including walking and bicycling."
Cambridge Food and Fitness Policy Council, Cambridge Public Health Department[68]	Policy roadmap includes continuing to "strengthen opportunities for physical activity including alternative and active transportation."
Cambridge Community Health Improvement Plan, *2015*[69]	"Advocate for improved transit infrastructure and funding, including increased system capacity (commuter rail, Green Line extension, increased Red Line frequency, new bus routes, increased shuttle services from hubs to businesses), and system improvements (increased number of clean air buses, priority bus lanes and signaling, and transit facilities such as bus shelters and wayfinding signage)."

Massachusetts and Regional Policies

Massachusetts Department of Transportation

weMove Massachusetts[70]	weMove Massachusetts is MassDOT's multimodal Long-Range Transportation Plan. Outreach for the plan "indicated the importance of an accessible and reliable transit system."
GreenDOT Policy Initiative[71]	Reduce greenhouse gas emissions; promote the healthy transportation options of walking, bicycling, and public transit; and, support smart growth development.
Mode Shift Initiative	Statewide goal of tripling the share of travel by bicycling, transit and walking and reducing driving trips.
Healthy Transportation Compact, MassDOT[72]	Requires state-level transportation decisions to balance the needs of all transportation users.
Healthy Transportation Policy Directive[73]	This policy directive requires that all MassDOT projects not only accommodate, but actively promote healthy transportation modes.

The Way Forward: A 21st-Century Transportation Plan[74]	The plan "describes the current state of our transportation infrastructure and details the investments necessary to stabilize today's transportation system and to build a system for the twenty-first century."
FY2014-FY2018 Transportation Capital Investment Plan[75]	"This integrated approach provides a foundation for understanding the total state investment in public transit, bike paths, paratransit, roads, bridges, airports, and railroads. In partnership with the We Move Massachusetts process, the CIP is also reflective of a more strategic process for choosing projects as we seek outcomes for the choices we make, such as better reliability in our transit system, investing in the health of the state's bridges or achieving our 2030 mode shift goals."
Design Guide standards on Complete Streets	Complete Streets is the comprehensive multi-modal philosophy in MassDOT's Project Development and Design Guide that requires safe and appropriate accommodation for all roadway users. Consideration should be made through all phases of a project so that even the most vulnerable (e.g., children and the elderly) can feel and be safe within the public right of way.

Other Commonwealth of Massachusetts Governmental Entities

Complete Streets Certification Program, Chapter 79 of the Acts of 2014[76,77]	Section 9: Chapter 90I: establishment of a complete streets certification program. "The department shall establish a complete streets certification program to encourage municipalities to regularly and routinely include complete streets design elements and infrastructure on locally-funded roads', where "Complete Streets" are "streets that provide accommodations for users of all transportation modes including, but not limited to, walking, cycling, public transportation, automobiles and freight." Section 2A, line item 6121-1318: $50 million authorization for complete streets certification program.
Mass in Motion, Massachusetts Executive Office of Health and Human Services[78]	Advocates for increased use of active transportation options.
Massachusetts Executive Office of Health and Human Services, Human Service Transportation Office[79]	"The HST Office reflects EOHHS' commitment to ensuring access to care and helping individuals live in their community of choice by improving transportation access to community-based supports."
Massachusetts Executive Office of Health and Human Services, Human Service Transportation Office, MassMobility project[80]	"Lack of transportation is a barrier to quality of life for seniors, people with disabilities, and low-income individuals across Massachusetts. When state agencies, human service agencies, community-based organizations, and transportation providers partner together and coordinate their services, they can help their consumers overcome this barrier."
Global Warming Solutions Act (GWSA), Massachusetts Executive Office of Energy and Environmental Affairs[81]	The Clean Energy and Climate Plan sets the statewide greenhouse gas emissions limit for 2020 at 25 percent below 1990 levels, the maximum authorized.
MBTA Sustainability Report, 2014[82]	The MBTA signed the American Public Transportation Association (APTA) Sustainability Commitment Pledge to "institute[e] procedures, policies, and programs designed to quantify their level of continuous improvements in the areas of water, energy, and fuel consumption, reduction in greenhouse gas emissions, increased recycling, and decreased waste generations, as well as other areas."

Regional Planning Agencies

Long-Range Transportation Plan, "Paths to a Sustainable Region," Boston Region MPO, 2011	Increase transit and other healthy transportation mode share.
Coordinated Public Transit—Human Services Transportation Plan, Boston Region MPO, 2015[83]	"The Coordinated Plan was expected to improve transportation services for elderly individuals, people with disabilities, people with low incomes, and to reverse commuters by maximizing collective coverage, minimizing duplication of services, and facilitating the most cost-effective transportation possible with available resources."
MetroFuture Vision, MAPC, 2008	An expanded transit system will provide better service to both urban and suburban areas, linking more homes and jobs; more people will use transit for work and personal services.

Other Entities

Massachusetts Public Health Association. Act FRESH Campaign: Advance Health Equity through Transportation Policy	"We call on the Legislature to invest in walking, biking, and public transit and to advance health equity with a long term solution to our state's transportation needs."[84] "Complete streets are one essential strategy to address health inequities. It is low income communities and communities of color who suffer the most from the effects of unsafe streets and lack of transportation options. These "incomplete streets" limit options for safe physical activity, as well as lead to higher pedestrian fatality rates, higher transportation costs, poor air quality, and barriers to opportunity that stand in the way of health, education, and prosperity for too many Massachusetts residents."[85]

National Policies

United States Department of Transportation

Moving Ahead for Progress in the 21st Century Act (MAP-21)	"MAP-21 creates a streamlined, performance-based, and multimodal program to address the many challenges facing the U.S. transportation system. These challenges include improving safety, maintaining infrastructure condition, reducing traffic congestion, improving efficiency of the system and freight movement, protecting the environment, and reducing delays in project delivery." "The Department will continue to make progress on transportation options, which it has focused on in the past three years, working closely with stakeholders to ensure that local communities are able to build multimodal, sustainable projects ranging from passenger rail and transit to bicycle and pedestrian paths."
Livability Policy Initiative[86]	"Livability means being able to take your kids to school, go to work, see a doctor, drop by the grocery or Post Office, go out to dinner and a movie, and play with your kids at the park – all without having to get in your car." (Ray LaHood, former US Secretary of Transportation)
Livability Initiative Fact Sheets, Federal Highway Administration[87]	Fact Sheets on a number of topics (for example, "Transportation and Health" and "Benefits of Livability") discuss transit and other sustainable transportation options.

Livability in Transportation Guidebook, Federal Highway Administration[88]	"The Livability in Transportation Guidebook's primary purpose is to illustrate how livability principles have been incorporated into transportation planning, programming, and project design, using examples from State, regional, and local sponsors." "While nearly four-fifths of Federal transportation funding goes to highway projects, almost 85 percent of people and jobs are in metropolitan areas, which offer the potential for significant improvements in multimodal travel choices." "Compact, connected communities encourage regular walking, wheeling, and transit use, reducing the need for auto travel—while making trips shorter for those who choose to drive."
Livability resources, Federal Highway Administration[89]	Resources "intended to assist decision makers and stakeholders interested in integrating livability principles into their communities' transportation systems."
Livability-related grants and programs[90]	Includes grants and programs that pertain to the following subjects: surface transportation improvement, accessibility to disadvantaged populations, fixed Guideway systems, rail, surface transportation planning, bike/pedestrian, marine transport, air transport, and research and miscellaneous.
Sustainability-related grant programs[91]	Includes TIGER, the FTA Low or No Emission Vehicle Deployment Program (LoNo Program), and the Capital Investment Grant Program.
Fixed Guideway Capital Investment Grants ("New Starts"), Federal Transit Administration[92]	"Provides grants for new and expanded rail, bus rapid transit, and ferry systems that reflect local priorities to improve transportation options in key corridors."
TIGER Discretionary Grant Program[93]	"The Transportation Investment Generating Economic Recovery, or TIGER Discretionary Grant program, provides a unique opportunity for the DOT to invest in road, rail, transit and port projects that promise to achieve critical national objectives." "In each round of TIGER, DOT receives many applications to build and repair critical pieces of our freight and passenger transportation networks. Applicants must detail the benefits their project would deliver for five long-term outcomes: safety, economic competitiveness, state of good repair, livability and environmental sustainability. DOT also evaluates projects on their expected contributions to economic recovery, as well as their ability to facilitate innovation and new partnerships." "Each project is multi-modal, multi-jurisdictional or otherwise challenging to fund through existing programs. The TIGER program enables DOT to use a rigorous process to select projects with exceptional benefits, explore ways to deliver projects faster and save on construction costs, and make investments in our Nation's infrastructure that make communities more livable and sustainable."
TIGGER Program, Federal Transit Administration[94]	"Managed by FTA's Office of Research, Demonstration and Innovation in coordination with the Office of Program Management and FTA Regional Offices, the TIGGER Program works directly with public transportation agencies to implement new strategies for reducing greenhouse gas emissions and/or reduce energy use within transit operations. These strategies can be implemented through operational or technological enhancements or innovations."

Other entities

Promoting Active Transportation: An Opportunity for Public Health, American Public Health Association[95]	"The importance of regional public transit systems and transit planning should not be overlooked, especially since people who live in communities with public transit tend to drive less and exercise more than those who live in communities that lack quality public transit. Public transit offers a lot of opportunity for improved health outcomes given that it is less polluting, safer and far more supportive of active transportation when compared to private automobile use."
American Planning Association[96]	"Our transportation networks must serve all users equitably, whether they walk, ride a bicycle, take transit, or use an automobile." Specific policy #2.4: "The American Planning Association, its Chapters and Divisions, and planners support an increased emphasis on public transportation, including buses, passenger rail, and other modes as a principal way to meet the mobility and access needs of our metropolitan regions [...] Transit facilities and services have the potential to guide compact, mixed-use, walkable development patterns that can lower housing and transportation costs, while providing choices to people of all ages and abilities to improve mobility and access."
American Public Transportation Association[97]	Works to "ensure that public transportation is available and accessible for all Americans in communities across the country."
Coordinating Council on Access and Mobility[98]	"Transportation plays a critical role in providing access to employment, medical and health care, education, and other community services and amenities. The importance of this role is underscored by the variety of transportation programs that have been created in conjunction with health and human service programs, and by the significant Federal investment in accessible public transportation systems throughout the Nation."

Endnotes

1 Image credit: Gretchen Ertl
2 Image credit: Charles River Transportation Management Association. http://www.charlesrivertma.org/ezride-shuttle/
3 Image credit: Massachusetts Department of Transportation Blog. http://blog.mass.gov
4 *Back on Track: an Action Plan to Transform the MBTA*. Special Review Panel, Governor Charles D. Baker. (2015). http://www.mass.gov/governor/docs/news/mbta-panel-report-04-08-2015.pdf
5 *Ridership and Service Statistics: Fourteenth Edition*. MBTA. (2014). http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf
6 "Goals and Objectives," *MetroFuture: Making a Greater Boston Region*. MAPC. (2008). http://www.mapc.org/sites/default/files/MetroFuture_Goals_and_Objectives_1_Dec_2008.pdf
7 *Ridership and Service Statistics: Fourteenth Edition*. MBTA. (2014). Population in service district based on 2010 Census data and tips are 2013 Typical Weekday Ridership for all modes (unlinked). http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf
8 "MetroFuture." MAPC. http://www.mapc.org/metrofuture
9 "Executive Summary," *Long-range Transportation Plan*. Central Transportation Planning Staff, Boston Region MPO. (2011). http://www.ctps.org/Drupal/data/pdf/plans/LRTP/paths/2035_LRTP_Exec_Sum.pdf
10 "MassDOT Announces Mode Shift Goal to Triple the Share of Travel in Massachusetts by Bicycling, Transit and Walking." MassDOT. (2012). http://www.massdot.state.ma.us/main/tabid/1085/ctl/detail/mid/2937/itemid/223/MassDOT-Announces-Mode-Shift-Goal-to-Triple-the-Share-of-Travel-in-Massachusetts-by-Bicycling--Transit-and-Walking-.aspx
11 Jaffe, E. "The 10 Biggest Factors Changing Millennial Driving Habits." CityLab. (2014). http://www.citylab.com/commute/2014/11/the-10-biggest-factors-changing-millennial-driving-habits/382763/
12 "Regional Growth Projections." MAPC. http://www.mapc.org/projections
13 *FY2014-FY2018 Transportation Capital Investment Plan*. MassDOT. http://www.massdot.state.ma.us/Portals/0/docs/infoCenter/docs_materials/cip_FY14_FY18.pdf
14 *Time is Money: the Economic Benefits of Transit Investment*. Chicago Metropolis 2020. (2007). http://www.edrgroup.com/pdf/timeismoney.pdf
15 *Moving Forward with Funding: New Strategies to Support Transportation and Balanced Regional Economic Growth*. MassINC. (2011). http://www.massinc.org/~/media/Files/Mass%20Inc/%20Research/Full%20Report%20PDF%20files/transitFinal.ashx
16 Press-Office, City of Münster, Germany. http://bp0.blogger.com/_k8Y0SWU8PJM/Rym__7u6Z_I/AAAAAAAAACk/55XpSWglWoE/s1600-h/espacio+coches.jpg
17 2009-2013 American Community Survey. U.S. Census Bureau. http://factfinder.census.gov/
18 2006-2010 American Community Survey. U.S. Census Bureau. http://factfinder.census.gov/
19 Evans, J.E. and R.H. Pratt, "Travel Response to Transportation System Changes." *Transit Oriented Development, TCRP Report 95*. Transportation Research Board. (2007). http://www.trb.org/TRBNet/ProjectDisplay.asp?ProjectID=1034
20 "Riding Public Transit Saves Individuals $9,242 Annually." American Public Transportation Association. (2010). http://www.apta.com/mediacenter/pressreleases/2010/Pages/100112_Transit_Savings.aspx
21 2006-2010 CTPP data. American Association of State Highway and Transportation Officials. http://ctpp.transportation.org/Pages/5-Year-Data.aspx
22 "Fact Sheets." Livability Initiative, USDOT Federal Highway Administration. http://www.fhwa.dot.gov/livability/fact_sheets/
23 *Community Health Improvement Plan*. Cambridge Health Alliance, Cambridge Public Health Department. (2015). http://www.cambridgepublichealth.org/policy-practice/public-health-accreditation/Final-Cambridge-CHIP-Report.pdf
24 "Equitable Streets." Smart Growth America. http://www.smartgrowthamerica.org/complete-streets/complete-streets-fundamentals/factsheets/equity
25 *2013 Annual Report*. Massachusetts Public Health Association. http://actionforahealthymass.files.wordpress.com/2013/11/2013-annual-report-final.pdf
26 Wener, R.E. and G.W. Evans. "A Morning Stroll: Levels of Physical Activity in Car and Mass Transit Commuting." *Environment and Behavior* 39.1 (2007): 62–74. http://eab.sagepub.com/cgi/content/abstract/39/1/62
27 *Priorities for Healthy Places 2013-2014*. Act FRESH Campaign, Massachusetts Public Health Association. http://www.mphaweb.org/documents/ActFRESH13-14_PrioritiesforHealthyPlaces.pdf
28 *Health is Where We Live, Learn, Work & Play*. Robert Wood Johnson Foundation. http://www.mphaweb.org/Inforgraophic_RWJF-NewPublicHealth-Transportation-handout.pdf.pdf
29 *Priorities for Healthy Places 2013-2014*. Act FRESH Campaign, Massachusetts Public Health Association. http://www.mphaweb.org/documents/ActFRESH13-14_PrioritiesforHealthyPlaces.pdf
30 Litman, T. "Terrorism, Transit and Public Safety: Evaluating the Risks." Victoria Transport Policy Institute. (2012). http://www.vtpi.org/transitrisk.pdf
31 Wener, R.E. and G.W. Evans, "A Morning Stroll: Levels of Physical Activity in Car and Mass Transit Commuting," Environment and Behavior 39, no. 1 (2007): 62–74. http://eab.sagepub.com/cgi/content/abstract/39/1/62
32 "Complete Streets Key to Achieving Health Equity." Massachusetts Public Health Association. (2014). http://mapublichealth.org/2014/01/30/complete-streets-key-to-achieving-health-equity/
33 Armah, N. and K. Benjamin. "Making equity count in the built environment." NAACP. (2014). http://www.naacp.org/blog/entry/making-equity-count-in-the-built-environment
34 *Livable Communities: an Evaluation Guide*. AARP Public Policy Institute. (2005). http://assets.aarp.org/rgcenter/il/d18311_communities.pdf
35 "Complete streets key to achieving health equity." Massachusetts Public Health Association. (2014). http://mapublichealth.org/2014/01/30/complete-streets-key-to-achieving-health-equity/
36 *Fast Facts: U.S. Transportation Sector Greenhouse Gas Emissions 1990-2012*. U.S. EPA. (2015). http://www.epa.gov/otaq/climate/documents/420f15002.pdf
37 *City of Cambridge Climate Protection Plan: Local Actions to Reduce Greenhouse Gas Emissions*. City of Cambridge. (2002). http://www.cambridgema.gov/~/media/Files/CDD/Climate/climateplans/climate_plan.ashx
38 "The role of transportation in promoting physical activity." Active Living Research. http://activelivingresearch.org/sites/default/files/ALR_Infographic_Transportation_July2012.jpg
39 *Public Transporation's Role in Responding to Climate Change*. Federal Transit Administration, USDOT. (2010). http://www.fta.dot.gov/documents/PublicTransportationsRoleInRespondingToClimateChange2010.pdf
40 *MBTA Sustainability Report*. MBTA. (2014). http://www.mbta.com/uploadedfiles/About_the_T/Environment/MBTA-2014-Sustainability-Report.pdf
41 "Climate Change Vulnerability Assessment and Adaptation Planning." City of Cambridge. http://www.cambridgema.gov/CDD/climateandenergy/climatechangeplanning/climatechangeresilianceandadaptation
42 *Flooded Bus Barns and Buckled Rails: Public Transportation and Climate Change Adaptation*. Federal Transit Administration, USDOT. (2011). http://www.fta.dot.gov/documents/FTA_0001_-_Flooded_Bus_Barns_and_Buckled_Rails.pdf
43 "Heavy Downpours Increasing." U.S. Global Change Research Program. (2014). http://nca2014.globalchange.gov/report/our-changing-climate/heavy-downpours-increasing
44 Karl, T.R., J.T. Melillo, and T.C. Peterson. *Global Climate Change Impacts in the United States*. Cambridge University Press, 189 pp. (2009). http://downloads.globalchange.gov/usimpacts/pdfs/climate-impacts-report.pdf
45 Image credit: Kleinfelder. See "Climate Change Vulnerability Assessment" website. City of Cambridge. http://www.cambridgema.gov/CDD/Projects/Climate/climatechangeresilianceandadaptation.aspx

46 June 11, 2012 Policy Order Resolution. City of Cambridge. http://www2.cambridgema.gov/cityClerk/policyOrder.cfm?item_id=39597
47 "Goals and Objectives," *MetroFuture: Making a Greater Boston Region*. MAPC. (2008). http://www.mapc.org/sites/default/files/MetroFuture_Goals_and_Objectives_1_Dec_2008.pdf
48 *Ridership and Service Statistics: Fourteenth Edition*. MBTA. (2014). http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf
49 *Ridership and Service Statistics: Fourteenth Edition*. MBTA. (2014). http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf
50 Enwemeka, Z. "400 Million Rides: MBTA Ridership Hit a Record High in 2014." (2015). http://www.wbur.org/2015/03/10/record-mbta-ridership
51 "Gov. Patrick Announces MBTA's Recommended Company To Build New Subway Cars In Mass." MBTA. (2014). http://mbta.com/about_the_mbta/news_events/?id=6442453194&month=1&year=14
52 2009-2013 American Community Survey. U.S. Census Bureau. http://factfinder.census.gov/
53 *Green Line Extension Project*. MassDOT. (2009). http://greenlineextension.eot.state.ma.us/documents/about/FactSheets/GreenLineFactSheet_F_lowRes.pdf
54 City of Cambridge analysis based on boarding/alighting data from MBTA Service Planning
55 *Ridership and Service Statistics: Fourteenth Edition*. MBTA. (2014). http://www.mbta.com/uploadedfiles/documents/2014%20BLUEBOOK%2014th%20Edition.pdf
56 Routes failing vehicle load standard (2012 service plan): 1, 47, 62, 64, 67, 69, 70, 71, 73, 75, 76, 77, 86, 87, 88, 96, 350, CT1. http://www.ctps.org/datacatalog_share/content/mbta-bus-performance-indicators-2012-service-plan
57 Charles River TMA Average Daily Boardings Report, 2015
58 http://commons.wikimedia.org/wiki/File:Commuter_train_at_Porter_1.jpg
59 Woodruff, A. "An MBTA Bus-iness Day." (2011). http://bostonography.com/2011/an-mbta-bus-iness-day/
60 "Community Compact for a Sustainable Future." City of Cambridge. (2013). http://www.cambridgema.gov/CDD/climateandenergy/climatechangeplanning/climateprotectionactioncommittee/communitycompactforasustainablefuture.aspx
61 "Cambridge in Motion." Cambridge Health Alliance, Cambridge Public Health Department. http://www.cambridgepublichealth.org/lifestyle/Cambridge_in_Motion.php
62 "Food and Fitness Policy Council." Cambridge Health Alliance, Cambridge Public Health Department. http://www.cambridgepublichealth.org/policy-practice/food-fitness-policy-council.php
63 *Community Health Improvement Plan*. Cambridge Health Alliance, Cambridge Public Health Department. (2015). http://www.cambridgepublichealth.org/policy-practice/public-health-accreditation/Final-Cambridge-CHIP-Report.pdf
64 MassDOT presentation on Green Line Extension to Cambridge Transit Advisory Committee, April 2015. http://www.cambridgema.gov/CDD/Transportation/forthepublic/transitadvisorycommittee
65 Sustainability and the MTA – Water. http://web.mta.info/sustainability/?c=Water
66 "Community Compact for a Sustainable Future." City of Cambridge. (2013). http://www.cambridgema.gov/CDD/climateandenergy/climatechangeplanning/climateprotectionactioncommittee/communitycompactforasustainablefuture.aspx
67 "Cambridge in Motion." Cambridge Health Alliance, Cambridge Public Health Department. http://www.cambridgepublichealth.org/lifestyle/Cambridge_in_Motion.php
68 "Food and Fitness Policy Council." Cambridge Health Alliance, Cambridge Public Health Department. http://www.cambridgepublichealth.org/policy-practice/food-fitness-policy-council.php
69 *Community Health Improvement Plan*. Cambridge Health Alliance, Cambridge Public Health Department. (2015). http://www.cambridgepublichealth.org/policy-practice/public-health-accreditation/Final-Cambridge-CHIP-Report.pdf
70 weMove Massachusetts: Planning for Performance. MassDOT. (2014). http://www.massdot.state.ma.us/Portals/22/Docs/WMM_Planning_for_Performance.pdf
71 *GreenDOT Implementation Plan*. MassDOT. (2012). http://www.massdot.state.ma.us/Portals/0/docs/GreenDOT/finalImplementation/FinalGreenDOTImplementationPlan12.12.12.pdf
72 "Healthy Transportation Compact." MassDOT. (2009). http://www.massdot.state.ma.us/GreenDOT/HealthyTransportation/HealthyTransportationCompact.aspx
73 "Healthy Transporation Policy Directive." MassDOT. (2013). https://www.massdot.state.ma.us/Portals/0/docs/GreenDOT/DirectiveHealthyTransportation.pdf
74 *The Way Forward: a 21st Century Plan*. MassDOT. (2013). http://www.massdot.state.ma.us/Portals/0/docs/infoCenter/docs_materials/TheWayForward_Jan13.pdf
75 *FY2014-FY2018 Transportation Capital Investment Plan*. MassDOT. http://www.massdot.state.ma.us/Portals/0/docs/infoCenter/docs_materials/cip_FY14_FY18.pdf
76 "Chapter 79, An Act Financing Improvements to the Commonwealth's Transportation System." Commonwealth of Massachusetts. (2014). https://malegislature.gov/Laws/SessionLaws/Acts/2014/Chapter79
77 "Complete Streets Certification Program: Incentivizing Complete Streets on Local Roads." WalkBoston. (2014). http://walkboston.org/sites/default/files/Complete%20Streets%20Certification%20Program%20Presentation%20for%20MassDOT%20Final%2011.5.14-1.pdf
78 "Mass in Motion." Department of Health and Human Services, Commonwealth of Massachusetts. http://www.mass.gov/eohhs/gov/departments/dph/programs/community-health/mass-in-motion/
79 "More About the HST Office." Department of Health and Human Services, Commonwealth of Massachusetts. http://www.mass.gov/eohhs/gov/commissions-and-initiatives/hst/more-about-the-hst-office.html
80 "MassMobility Outreach." Department of Health and Human Services, Commonwealth of Massachusetts. http://www.mass.gov/eohhs/gov/commissions-and-initiatives/hst/massmobility-outreach.html
81 "Global Warming Solutions Act Background." Department of Energy and Environmental Affairs, Commonwealth of Massachusetts. http://www.mass.gov/eea/air-water-climate-change/climate-change/massachusetts-global-warming-solutions-act/global-warming-solutions-act-background.html
82 *MBTA Sustainability Report*. MBTA. (2014). http://www.mbta.com/uploadedfiles/About_the_T/Environment/MBTA-2014-Sustainability-Report.pdf
83 *Coordinated Public Transit-Human Services Transportation Plan*. Boston Region MPO. (2015). http://www.ctps.org/Drupal/data/pdf/plans/CHST/CHST_Plan_Update_010815.pdf
84 "The Act FRESH Campaign." Massachusetts Public Health Association. http://mphaweb.org/Transportation_and_PublicHealth.htm
85 "Active Streets Bill Signed into Law!" Massachusetts Public Health Assocation. (2014). http://mapublichealth.org/2014/04/22/active-streets-bill-signed-into-law/
86 "Livability." USDOT. http://www.dot.gov/livability
87 "Fact Sheets." Livability Initiative, Federal Highway Administration, USDOT. http://www.fhwa.dot.gov/livability/fact_sheets/
88 *Livability in Transportation Guidebook: Planning Approaches that Promote Livability*. Federal Highway and Federal Transit Administrations, USDOT. http://www.fhwa.dot.gov/livability/case_studies/guidebook/livabilitygb10.pdf
89 "Livability Resources." USDOT Federal Highway Administration. http://www.fhwa.dot.gov/livability/resources/
90 "Grants and Programs." Livability initiative, USDOT. http://www.dot.gov/livability/grants-programs
91 "Grant Program." Sustainability mission, USDOT. http://www.dot.gov/mission/sustainability/grant-programs
92 "About TIGER Grants." USDOT. http://www.dot.gov/tiger/about
93 "Capital Investment Program: New Starts, Small Starts, and Core Capacity Improvements." Federal Transit Administration, USDOT. http://www.fta.dot.gov/12304.html
94 "TIGGER Program." Federal Transit Administration, USDOT. http://www.fta.dot.gov/grants/13094_11424.html
95 *Promoting Active Transportation: An Opportunity for Public Health*. American Public Health Association. http://www.apha.org/~/media/files/pdf/topics/transport/links_final_active_primer_singles.ashx
96 "Policy Guide on Surface Transportation." American Planning Association. (2010). https://www.planning.org/policy/guides/adopted/surfacetransportation.htm
97 "About APTA." American Public Transportation Association. http://www.apta.com/about/Pages/default.aspx
98 "About United We Ride & the Coordinating Council." Coordinating Council on Access and Mobility. http://www.unitedweride.gov/1_3_ENG_HTML.htm