



CITY OF CAMBRIDGE
COMMUNITY DEVELOPMENT DEPARTMENT

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Community Development

To: Planning Board
From: CDD Staff
Date: August 13, 2014
Re: **Planning in the Alewife "Triangle"**

The attached material was prepared in response to questions asked by the Planning Board at its previous hearing on case #292, the proposed residential development at 88 (erstwhile 180R) Cambridgepark Drive.

In general, the Planning Board expressed a desire to look deeper into planning for the entire "Triangle" district – referring to the portion of the Alewife area on either side of Cambridgepark Drive – as an emerging residential neighborhood. Issues identified by the Planning Board included transportation, retail, stormwater management and flooding, and promoting a "sense of place" in the district. Information on all of these topics has been assembled with input from various CDD divisions (including Community Planning, Environmental & Transportation Planning, and Economic Development) and in collaboration with the Traffic, Parking and Transportation Department (TPT) and the Department of Public Works (DPW).

- This CDD memo gives a broad overview of the area and its development over time, with a focus on land uses, urban design, pedestrian and bicycle circulation, open space and neighborhood planning.
- An accompanying TPT memo focuses more specifically on issues of parking and traffic.
- A supplemental memo prepared by the City Engineer (DPW) focuses on stormwater management, flood hazard mitigation and infrastructure.

We hope this provides useful background information for the Planning Board in its review of case #292. Staff from the different departments will be available to answer questions at the August 19 continuation of the public hearing.

Development History

Early Urbanization (through 1960s)

Before being developed, the area around the Alewife Brook, Little River and Fresh Pond was characterized by marshland and clay pits that were mined for brick-making. The “Triangle” was defined by the establishment of the Fitchburg Railroad (to the south, now a commuter rail line) and Lexington and West Cambridge Railroad (to the north, which no longer exists) in the 1840s. The creation of Alewife Brook Parkway in 1916 formed the eastern boundary.

From the 1940s through the 1960s, the Triangle area was developed mostly for industrial uses (heavy and light), with some retail uses established along the parkway.

Alewife Revitalization (1970s-1990s)

A shift in planning for the area occurred when the extension of the Red Line was contemplated in the 1970s and 1980s. The Red Line extension not only brought rapid transit service to the area, it brought a 2,700-space MBTA parking garage and associated roadway improvements that would make the area more attractive as a regional node for auto commuters from west, north and south of Cambridge.

In 1979, the Community Development Department released the *Alewife Revitalization* report, which established a planning and urban design vision for the area. The emphasis of the plan was to encourage a transition from industrial and low-scale retail uses to offices, with a particular focus on research and development. Housing was mentioned but not identified as a priority, reflecting the City’s desire to promote tax revenue-generating enterprises. One objective of the study was to control the height and density of development in order to manage impacts on roadways and natural resources.

That study also promoted an enhanced open space “network” by returning the parkway system to its original park-like character and improving natural resources such as the Alewife Reservation to balance nearby developed areas. Priorities also included wetland protection and mitigating flood risk in the 100-year flood plain. One recommendation that was not implemented was the creation of an expanded street network that would widen Cambridgepark Drive and New Street and connect both to the Quadrangle area via an overpass (for the former) and underpass (for the latter).

Development in the Triangle in the 1980s and 1990s was fairly consistent with this plan. From the 1980s to the early 1990s, about one million square feet of office and lab development was built on Cambridgepark Drive, replacing nearly all of the former industrial uses in the area. Most of the development generally followed the urban design guidelines of the revitalization plan, resulting in many taller office buildings surrounded by open space; however, the large threshold for special permits allowed several projects to proceed with minimal design review. The development was mostly auto-oriented and resulted in significant new parking, as reflected in the accompanying memo compiled by the Traffic, Parking and Transportation Department. The resulting traffic, combined with regional through-traffic and retail traffic along Alewife Brook Parkway, has contributed to weekday congestion in the area overall and on Cambridgepark Drive in particular.



1865 Map ("Triangle" superimposed)



1947 Photo



1969 Photo



1995 Photo



2010 Photo



2013 Photo

Growth Policy and Concord-Alewife Plan (2000s)

Another shift in planning for the city began with the establishment of the *Toward a Sustainable Future* Citywide Growth Policy in 1993 and subsequent policy initiatives including the Parking and Transportation Demand Management (PTDM) Ordinance in 1996, Inclusionary Housing ordinance in 1998, and Citywide Rezoning in 1999-2001. Taken together, these efforts reflected a new set of planning objectives. Housing growth was prioritized to balance new commercial development and mitigate housing affordability issues. Policies favored walking, bicycling and public transportation over auto travel in order to reduce congestion and pollution. Development controls continued to limit density and height, allowing lower-scale residential development near existing residential neighborhoods and higher-scale mixed-use development in former industrial areas close to public transit. Citywide project review requirements were also established.

In the Triangle, these priorities were reflected in the Concord-Alewife Planning Study, which began in 2004 and resulted in the *Concord-Alewife Plan* and associated rezoning in 2006. The vision for the area was to evolve into a mixed-use district with housing, offices and retail, improved pedestrian, bicycle and transit connections, and improvements in stormwater management and open space. The rezoning reduced the allowed amount of commercial development, and allowed the highest densities in areas closest to Alewife Station, such as the Triangle. The goal of this strategy was to promote a more transit-oriented pattern of development that balances residential and employment opportunities. The strategy was also intended to result in less auto traffic growth than prior development, because housing is less densely occupied than office and because Cambridge residents tend to commute by car in lower percentages than office employees.

Under the Concord-Alewife rezoning, new development would follow a set of design guidelines and contribute to areawide infrastructure improvements in support of the overall plan.

Current Trends

There are several apparent trends that are defining this stage in the development of the Triangle:

- **Housing Growth:** While the Concord-Alewife study anticipated new housing, and the Triangle was already being seen as an attractive area for housing while the study was underway, the post-Great Recession rebound in the housing market has precipitated a rapid transformation. The residential projects that are built, under construction or permitted in the area will provide around 1,500 total units of housing on Cambridgepark Drive, and will result in a more evenly balanced mix of office and housing in the district.
- **Office Turnover:** While Cambridgepark Drive has been home to a variety of firms over the past few decades, a shift in office culture has begun to emerge recently. A business association has recently formed to foster area-wide coordination and planning for amenities such as alternative transportation and retail. Also, some newer technology companies have begun moving to Alewife as an attractive and more affordable alternative to Kendall Square. One example is Vecna Technologies, a growing company that recently began recruiting food trucks to their parking lot as an amenity for the area.

- **Parking Ratio Reductions:** As discussed in the memo prepared by the Traffic, Parking and Transportation Department, the growth in housing has been accompanied by an overall reduction in office parking ratios and the permitting of shared parking arrangements, whereby spaces can be used by office users in the daytime and residential users at night. Residential projects have been proposed at or below one space per unit, with some parking provided as shared between residential and office uses, to be used flexibly as demand dictates.
- **Public Investments:** As growth has occurred in the Triangle, the City has been directing attention toward infrastructure improvements identified in the Concord-Alewife Plan and other initiatives. Some improvements, like the pedestrian/bicycle bridge over the railroad line, have a long lead time to implement and are still in planning stages. An example of a completed infrastructure project is the Alewife Stormwater Wetland, which was named a 2014 Public Works Project of the Year by the American Public Works Association. Infrastructure and other issues related to stormwater management are discussed further in the sections prepared by the City Engineer.

Future Planning Issues

Cambridgepark Drive is clearly undergoing a significant transformation with the development of new housing units. However, not much of the permitted housing has been occupied so far, and there are changes in commercial building tenancy and ownership that are still being resolved. Moreover, there are still a handful of remaining sites with potential for future expansion or redevelopment, including the lower-scale buildings at 32-36 Cambridgepark Drive and 149-153 Alewife Brook Parkway (“Summer Shack” site) as well as surface parking lots serving other office buildings (see attached area map).

Just as other Cambridge neighborhoods have evolved historically, a changing population will result in changing demands and expectations leading to a longer-term evolution in the character of the area. While 1,500 housing units is a small “neighborhood” by Cambridge standards (most neighborhoods have 2,000-7,000 housing units), the combination of several thousand employees and residents will require attention to “neighborhood planning” issues that are relevant throughout the city and will need to be addressed through collaborative action among residents, businesses and the City.

Retail

Cambridge neighborhoods tend to have access to some combination of major retail centers (like Central, Harvard, Porter Squares) and clusters of smaller-scale neighborhood-serving retailers on main streets. Although Cambridgepark Drive is adjacent to one of Cambridge’s major retail centers along Alewife Brook Parkway, the connections are not as pedestrian-friendly as they are in other neighborhoods. Improving retail service to residents of the area will require improving pedestrian and bicycle access to major stores on Alewife Brook Parkway as much as providing retail in the area itself.

Retail on Cambridgepark Drive is limited to a few establishments within the Alewife T station structure, the “Summer Shack” building on Alewife Brook Parkway, and the limited-service “Whole Foods Café” located within the office building at 125 Cambridgepark Drive. New residents will likely generate new demand for retail that provides direct and convenient service to employees and residents of

Cambridgepark Drive, in contrast with the auto-oriented retail found elsewhere in the area. The most viable retail locations are those that will be conveniently accessible to employees and residents from multiple buildings, such as the Cambridgepark Drive frontage and places near Alewife Station. When a pedestrian/bicycle connection over the railroad tracks is sited, that could be an attractive site for retail that would serve occupants in both the Triangle and Quadrangle.

Viable types of retail might include small restaurants and cafes, convenience stores and consumer services like dry cleaners. If local retailers are desired, in order to be affordable, the spaces would need to be relatively small – 1,000-2,000 square feet – and assistance from developers might be needed to ensure that the space can be fit-out to support the equipment necessary for that use. Larger retail spaces should be divisible to allow for multiple smaller retailers.

Additionally, as experience has shown in emerging retail areas like Kendall Square, viable retail often occurs in “double-sided” clusters, so it is important to create retail spaces across the street from existing retail or from locations where there is likely to be retail in the future. It is also helpful for food uses such as cafés to have small outdoor spaces (as discussed below) nearby as an amenity to customers and to improve visibility.

Open Space

The Triangle is close to many significant and unique natural resource amenities, including Alewife Reservation and Fresh Pond. However, neighborhoods require not just natural areas but active-use spaces such as smaller urban parks and playgrounds, especially as families with children populate the area. The nearest active-use public parks in the Triangle are Danehy Park and Russell Field, both large facilities, but both of which are at least a half-mile away and separated from the Triangle by Alewife Brook Parkway, which must be crossed either via an underpass at the MBTA station or by crossing at-grade. In most of the city, residents live within a quarter-mile distance of a small urban park or playground, often only an acre or less in size.

As with retail, enhancing the neighborhood character of the area will require a combined strategy of improving pedestrian and bicycle connections to existing nearby resources and creating new small open spaces just to serve Cambridgepark Drive residents and employees. Residential development is encouraged by zoning to include private open space for residents, which serve a similar function to the “backyard” of a house. However, neighborhood character would also be improved by providing small open spaces that are welcoming to the public in locations where residents of different buildings are likely to encounter each other, such as near entrances and walkways or outside retail spaces.

A space closer to the midpoint of Cambridgepark Drive could be a desirable location for a small neighborhood park that is easily accessible to residents and employees. Such a space could also serve as a central organizing element (a “heart,” as noted at the last Planning Board meeting) that is seen to be lacking in the neighborhood. This effort would be challenging given the lack of publicly-owned land on Cambridgepark Drive itself, so development partnerships will be required. The zoning for the area provides incentives to dedicate land to public use and transfer the development rights to adjacent sites, but more encouragement may be needed to take better advantage of that mechanism.

Urban Design

Creating a neighborhood or community feel should be considered primary components of the urban design vision for the Triangle. While there are limitations associated with the property ownership patterns in the area, the focus should be how buildings hit the ground and ensuring building facades contribute to the liveliness, visual interest and comfort of adjacent streets, drives, parks and other public spaces. In this sense, encouraging a human scale, inviting and open pedestrian entries, maximizing ground floor retail, optimizing site permeability, vertical articulation to break the horizontal elements of buildings, innovative and diverse façades, and avoiding flat silhouettes should all be key aims.

Experience with past projects in the area has shown the difficulty of balancing the urban design goal of active ground floors with the practical requirements of building in the 100-year flood plain. Large buildings with long frontages, few ground-floor entrances, and parking dominating the ground floor have limited the ability to create a sense of urban street frontage, and require significant attention to the public realm along the street edge. Past design review efforts by the Planning Board resulted in improvements, but further experimentation could help identify better solutions. As the two housing projects currently under development begin to be occupied, it will be helpful to observe how residents and passersby interact with the buildings along the ground floor to understand the issues better and identify practical opportunities for improvement.

Housing

One of the city’s priorities with all new residential development is to provide a diversity of housing types. Along with providing affordable units per the requirements of the Inclusionary Housing ordinance, the city’s development objectives encourage units of various sizes to accommodate different family sizes, particularly families with children. Although many new housing developments in the Triangle are similar in that they are large multifamily buildings, there are still opportunities to provide a greater diversity of housing unit types within buildings. With large residential buildings, it is especially important to consider whether there are amenities that can serve families with children, such as safe and convenient play areas and storage space. Some communities (notably, Vancouver, BC) have applied these types of design standards to new large-scale housing developments that have been successful in attracting families with children.

Pedestrian/Bicycle Connections

As mentioned in other sections, planning for improved pedestrian/bicycle connections to nearby shopping and open space amenities will be important to serve the emerging neighborhood. Connections to regional transit and pedestrian/bicycle paths will also be important to the quality of life for residents and employees alike, and will help to define the character of the neighborhood.

Regional and local multi-use paths have been created and are continuing to expand to and through the Alewife Triangle area. The Minuteman Commuter Bikeway, Linear Park, Belmont Path along the Reservation, and Fresh Pond Parkway path are well established. The recently abandoned rail line along Fresh Pond will be further developed to link to Watertown and the Charles River, and there are long-

term plans to connect the Triangle area with a path along the Fitchburg line to Sherman Street and potentially up to Porter Square. (See the attached maps for more detail.) These connections support and supplement the broader transportation system in the region, especially as bicycling is becoming an increasingly attractive commuting option for Cambridge residents.

The creation of a bicycle/pedestrian bridge across the railroad tracks to connect the Triangle with the Quadrangle is a high priority project. Work on the Alewife Bridge feasibility study has partly begun with the hiring of a consultant using funds collected from the mitigation requirements for projects receiving a special permit from the Planning Board. The City also saw an opportunity to apply for a federal TIGER grant, which would provide funds for the complete design, through construction documents, of a stand-alone bridge. If that grant is not received, the feasibility study will nonetheless move ahead in the fall and focus on identifying one or more potential bridge landing sites, but will not complete any conceptual design until a final landing site is identified and secured on the Quadrangle side, and additional design funds are identified. This study would take about 8-10 months.

Public Transportation

Transit availability will continue to be a key issue looking forward, not just in terms of moving commuters into the city via the Red Line but in terms of moving residents and employees between Alewife and the western suburbs. These connections, either through shuttles or expanded MBTA bus service, may provide creative opportunities to get Alewife residents to businesses in the western suburbs while simultaneously bringing residents of the western suburbs to Alewife businesses. Improved pedestrian/bicycle connections are also important in this respect, because many transit riders currently access the Alewife MBTA station by car. The establishment of a Transportation Management Agency (TMA) in the area will provide an important opportunity for residential and business interests to address these issues collaboratively.

The Concord-Alewife Plan identifies the desirability of establishing a stop on the Fitchburg Commuter Rail serving Alewife. If created, this station would likely occur at the same location as the envisioned pedestrian/bicycle bridge. Such a connection would provide benefits in two ways by providing a transit alternative to suburban centers as well as an alternative transit route for Alewife residents to get to Boston. The Massachusetts Department of Transportation (MassDOT) has recently expressed interest in exploring this idea, and given the timing and the opportunity presented by the TIGER grant application, the bridge and a potential commuter rail stop could be studied in combination.

The Hubway bike share system is an important new transportation option for the region that has been very popular in its few short years of existence. This year, the system has expanded west to the Alewife station (with a Hubway station recently located at the eastern MBTA headhouse, near Russell Field) and the desire is to add complementary stations in the Alewife area in the near future. Neighboring communities have also expressed serious interest in being added to the system. This will expand travel options for residents and workers alike, allowing people to connect from other parts of the system and to extend the reach of the transit system without reliance on shuttles.

Traffic and Parking

These issues are discussed in greater detail in the attached memo from the Traffic, Parking and Transportation Department (TPT). In general, the Triangle faces issues similar to other Cambridge neighborhoods that are impacted by regional through-traffic, though the scale of the regional traffic in Alewife is greater. Experience has shown that in Cambridge neighborhoods with good access to public transportation, the proportion of commuters who drive is very low compared to the rest of the region, and has been decreasing in recent years as Cambridge residents have increasingly embraced walking, bicycling, public transportation and other non-auto modes. The advantage of locating housing in the Triangle is that it provides alternatives for residents who would otherwise have to find housing outside of Cambridge, where they might be more likely to commute by car and contribute to the regional traffic issues affecting the area.

Future transportation planning will also involve continued work to reduce expectations and need for parking. As evidenced in Kendall Square, managing parking supply is one of the tools that can help to reduce traffic generation. While the parking ratios for office uses in the Alewife area have been reduced significantly over the past 20 years (as explained in the TPT memo), they are not as low as levels that are typical in other transit-served areas of Cambridge. Continued strategic thinking will be needed to ensure that parking supply can be kept at the lowest levels necessary over time while investments are made in pedestrian, bicycle and transit improvements. Strategies might include incentives for future office and/or residential developers to share existing parking in order to reduce the amount of new parking that gets built, and/or parking garage designs that can be converted to other uses as parking demand decreases.

Goals: The Triangle

- Encourage more transit-oriented development. Allow higher density and height to take advantage of proximity to Alewife Station.
- Continue to allow commercial development to be focused in this area, while also encouraging housing close to the T station.
- Create a pleasant, walkable connection between Alewife Reservation and Fresh Pond Reservation consistent with the Alewife Reservation Master Plan and the Fresh Pond Master Plan.
- Create public access to the Alewife Reservation from Cambridgepark Drive.
- Reduce auto mode share within the Triangle.
- Improve bicycle and pedestrian connections among the Minuteman Trail, Belmont Path, Linear Park, and a future pathway along the Watertown rail line.
- Improve signage and enhance access to the multiuse trail from Alewife Station.
- Encourage development of additional housing close to Alewife Station while continuing to support commercial development.





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MEMORANDUM

To: Cambridge Planning Board
From: Sue Clippinger
Date: August 12, 2014
Re: Alewife Area Parking and Traffic

The following information is provided to address questions raised by the Planning Board regarding parking and transportation in the Alewife Triangle.

- A. Triangle Parking History
- B. Traffic Conditions and Cumulative Traffic Impacts
- C. MassDot's Route 2/16 Project

A. Triangle Parking History

Alewife Triangle has a long development history, though most current development was built starting in the 80s with the Red Line extension to Alewife. The Alewife MBTA station has 2,733 spaces according to the MBTA web site. Below we summarize the parking changes that have occurred west of the Alewife Station Access Road.

1980 - 1990s: Office Park Projects

- Spaulding and Slye sought to develop an office park with a large amount of parking. The developer even paid FAR penalties because parking exceeded the maximum parking allowed by zoning.
- Three buildings were built (**#100, #125 and #150**) totaling approximately 570,000 sf. of office space with 1,623 spaces (2.8 as a ratio of spaces per 1,000 square feet).
- In 1986, additional development of 500,000 sf .office space (or 300,000 sf office space and a 250 room hotel was proposed), but never developed.
- In 1999, **#200 Cambridgepark Drive** building was constructed with approximately 218,000 sf of office/lab space and 349 spaces. **#200 Cambridgepark Drive** also leases 110 spaces off-site for a total parking ratio of 2.1. **#200 Cambridgepark Drive** was also subject to the new Parking and Transportation Demand Management (PTDM) regulations requiring efforts to reduce SOV (single occupancy vehicle) travel among employees.

2000s: #30 CPD Built. Additional Office/R&D Proposed, But Not Built

- In 2003 the **#30 Cambridge Park Drive** residential building was built with 312 units of housing and 312 new parking spaces.
- In 2008 two R&D buildings (**#150 and #180 Cambridgepark Drive**) were proposed by **Archon Group, L.P.** totaling approximately 338,000 sf. and 644 new parking spaces (1.9 spaces/1,000 sf) . TPT worked very hard with Archon to reduce their parking ratio from an original proposed ratio of 2.8 to approximately 1.90/1,000. Their employee SOV mode share goal was 59%, which was consistent with **#200 Cambridgepark Drive** SOV goal. The project was never built.

2010s: Residential Housing Demand Booms

- In 2012, **#160 Cambridgepark Drive** with 398 residential units and 398 spaces was proposed. The city was able to reduce the total parking in the triangle by 150 spaces with sharing of parking between residential and non-residential uses.
- In 2012, **#165 Cambridgepark Drive** (Hines) was proposed with 244 units. 215 spaces were approved (0.89 space/unit).

- In 2013, the **#130 Cambridge Park Drive** residential project with 220 units was proposed. Again with the shared parking the city was able to reduce the number of new parking spaces from 220 spaces to 149 net new spaces.
- In 2014, the **180R/norw 88 Cambridgepark Drive** residential project was proposed with 378 units, including 220 dedicated residential spaces and 96 shared spaces (0.84 space/unit). Again the number of new parking spaces could be reduced by allowing sharing. Revisions to that project are now being proposed.

Summary: Office Parking

The recent boom in residential projects has created opportunities to rethink parking needs for the Triangle as the sea of surface parking lots has been relocated into structured parking within the proposed developments.

In the 1980s when the Triangle was envisioned as an office park, parking ratios were as high as 3.0/1,000 sf. Starting in 2012, TPT has worked with the office property owners to evaluate the parking needs in the Triangle. Using information about employee density within the buildings and the SOV percentages, the parking ratios have been reduced to 2.06/1,000 sf. This means that the parking associated with the buildings at **#150 and #125 Cambridge Park Drive** has been reduced by 406 spaces. If the parking ratios for 100 and 200 were also reduced to 2.06/1,000, that would only reduce the total office parking supply by 50 spaces.

Currently the four office buildings at **#100, #125, #150 and #200 Cambridgepark Drive** have an average parking ratio of 2.1/1,000. They represent 790,000 sq ft with 1,676 parking spaces, a reduction from a total of 1,972 in the 1990s. No new office/R&D development has occurred since **#200 Cambridge Park Drive**.

The attached map illustrates parking ratios for office buildings.

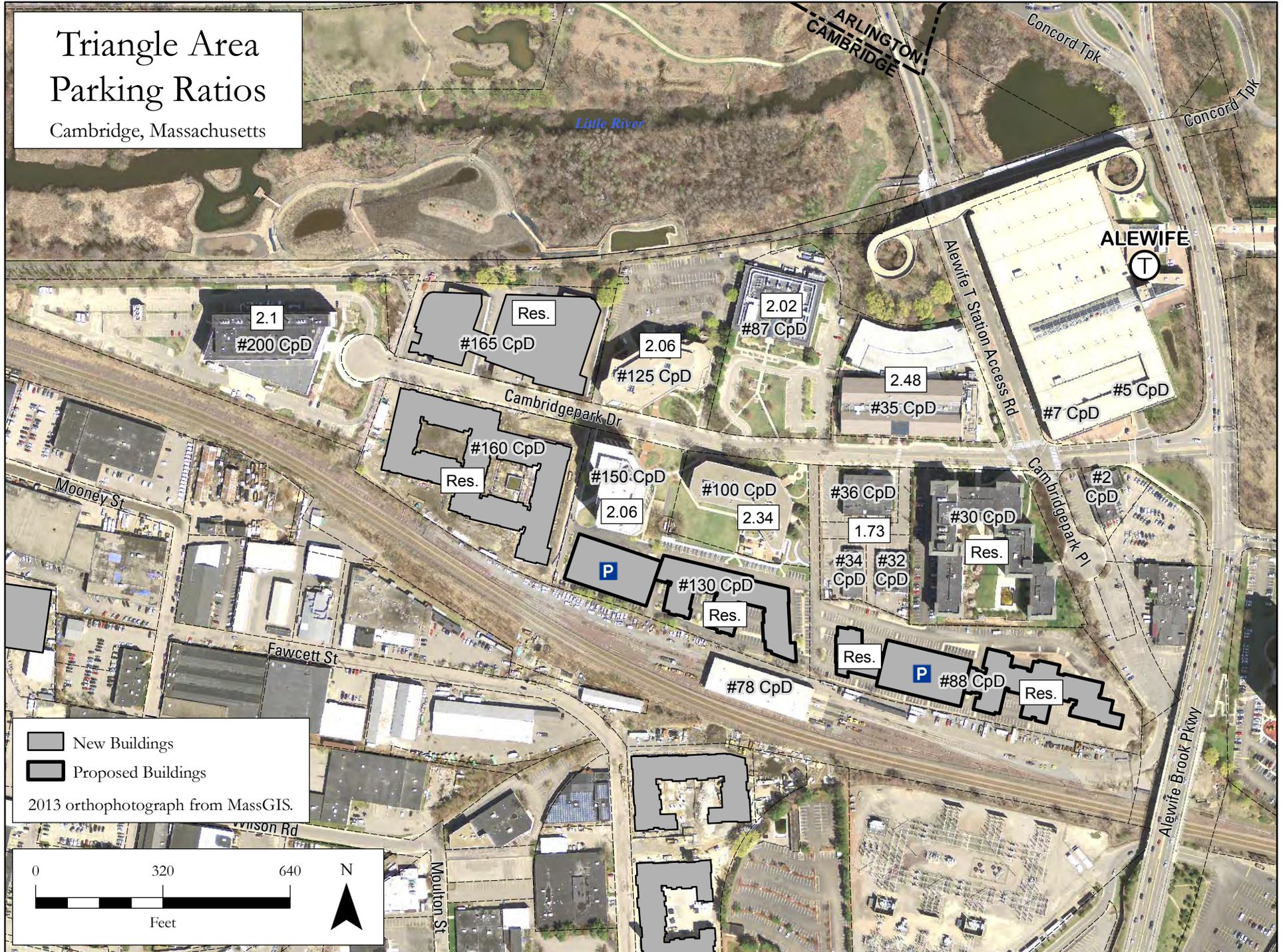
Summary: Residential Parking

The 2005 Concord-Alewife Plan encouraged housing development in the Triangle for a mixed-use area. The first residential building was built in 2003 and since 2012 three new residential buildings have been permitted and a fourth is proposed.

The residential buildings at **#30, #160, #165 and #130 Cambridgepark Drive** include 1,174 units of housing. Parking needs for residential parking and office parking can be shared, since one peaks in the day and the other at night. The residential projects have added 924 spaces to the area while using 221 of the existing office parking to support their night time peak needs. Overall, the residential day time parking ratio is 0.79/unit and the night time ratio is 0.98/unit.

Triangle Area Parking Ratios

Cambridge, Massachusetts



- New Buildings
- Proposed Buildings

2013 orthophotograph from MassGIS.



B. Traffic Conditions and Cumulative Traffic Impacts

Direct traffic counts measured periodically between 1998 and 2013 show that Route 2 carries approximately 53,000 average vehicles per day (vpd), Alewife Brook Parkway about 45,000 vpd, and Mass. Avenue about 22,000 vpd. A 2007 regional study conducted by the Central Transportation Planning Staff (CTPS) for Cambridge found that about 82% of traffic on Alewife Brook Parkway was regional (61% north-south cross-regional traffic, 21% to downtown Boston and nearby Boston neighborhoods) while only 18% of traffic has destinations in Cambridge.

Since 1998, traffic counts have indicated that average daily vehicle trips on Alewife roads has been level or decreased. However, counts taken throughout the day in 2008 and 2013 show a period of consistently high traffic volumes between 3:00pm to 6:00pm on weekdays, when Alewife Brook Parkway carries about 3,000 and 3,500 vehicles per hour.

Data from the MBTA show that typical weekday entrances at Alewife Station have increased 19% since 1998. Also, direct counts taken throughout the city since 2007 show that bicycling in Cambridge has tripled in the last decade.

The 2006 Concord-Alewife Plan recommended residential uses to support a transit-oriented, mixed use neighborhood. Residential uses generate less trips and better non-auto mode share than office use. For instance, Census data from 2010 show that only about 30% of Cambridge residents drive alone to work, compared to 45% of employees working in Cambridge, many of whom live outside of the city.

Traffic Impact Studies

Large development projects that trigger the requirement for a Traffic Impact Study (TIS) must evaluate the project's traffic impacts and the future cumulative transportation impacts. The TIS includes analysis of existing traffic conditions through direct counts, estimates of future growth, and estimates of trip generation for the proposed project. Trip generation projections are based on national and local standards for trip rates, and in cases where information is available, direct driveway counts at existing sites in the area may be collected. For instance, recent TIS projections for residential projects under review near Alewife have included driveway counts at three existing projects: 30 Cambridgepark Drive, 87 New Street and 25-39 Wheeler Street. These counts have confirmed that the TIS projections for new projects are consistent with observed counts for the AM peak and somewhat overestimate the observed PM peak hour trip generation, meaning the traffic studies assume more trips during peak hour than observed for similar buildings. Overall, the projections assume that about 45% of residents in new Alewife development will travel to work by SOV.

As mentioned earlier, Traffic Impact Studies include a Future conditions scenario. The scenario takes into account the proposed project trips, other proposed, permitted or under construction project trips, and a background traffic growth rate. An attached graphic shows the PM Peak Hour Cumulative New Trips from all new residential development in the Alewife Area (8 projects), including the 180R/88 Cambridgepark Drive project (as it was originally proposed for 378 units). Revisions to the project are now being proposed.

What does it all mean? The following observations can be made:

- Current congestion will remain even if there is no new development in Alewife.
- Congestion will cause some residents to choose other modes of travel, or to travel off-peak if they commute by car.
- Local trips will displace some regional trips to roads to the east, west, north and south of Alewife.
- New residents choosing to live here will be less likely to drive and more likely to use sustainable modes than if they lived further out in the suburbs.
- Encouraging sustainable modes as an alternative to driving will be the most viable way to manage traffic in this area.

C. MassDOT's Route 2/16 Project

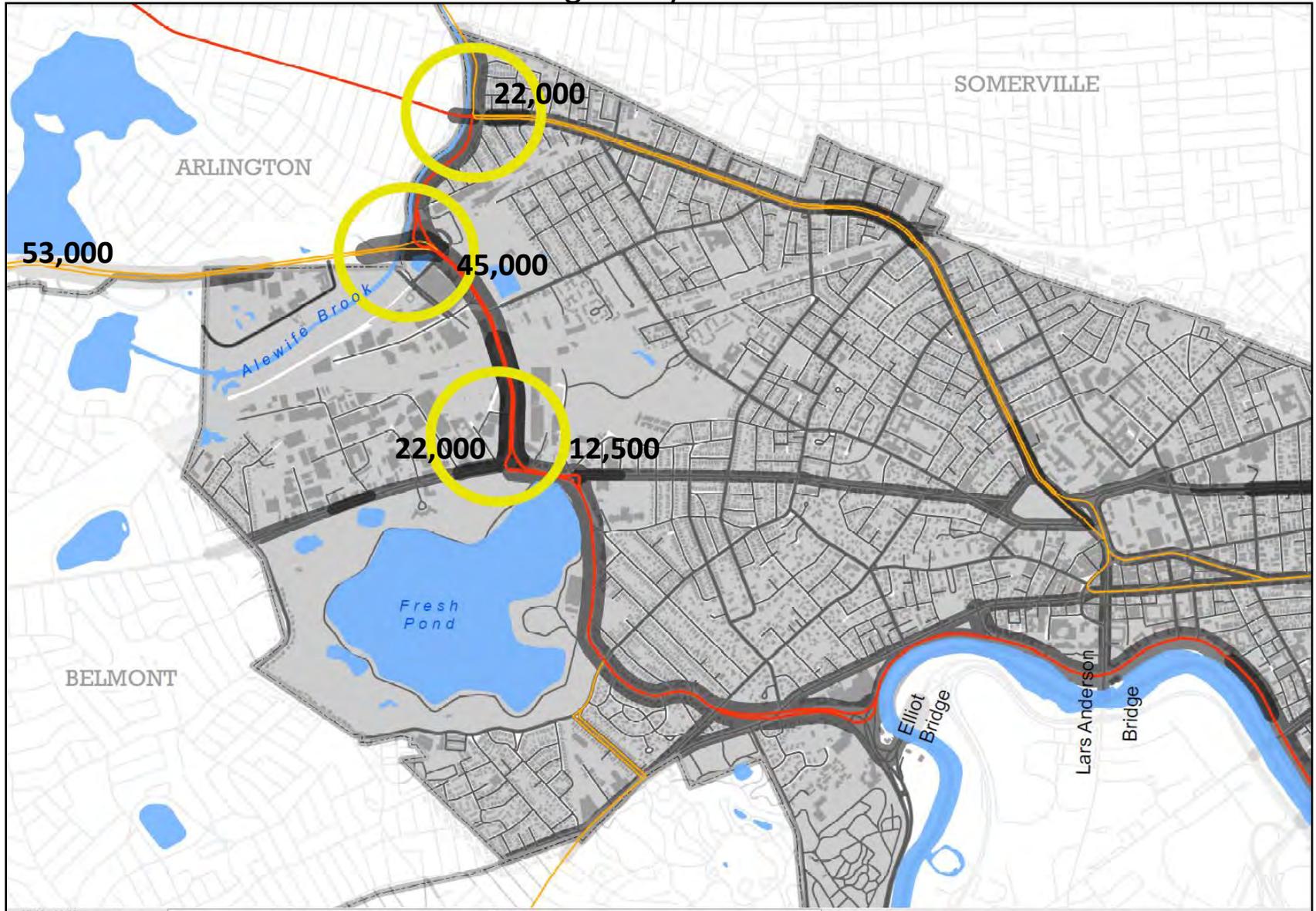
MassDOT's Route 2/16 Improvement Project, which includes traffic operations and safety improvements, is expected to begin in 2016 and will address some existing transportation issues within the intersection, including reducing vehicle delay for Rt. 16 southbound and northbound vehicles heading toward Rt. 2 westbound and preventing vehicle queuing from blocking other moves within the intersection.

The project will also include signal timing changes at Alewife Brook Parkway/Rindge Avenue in the evening peak hour, which will reduce pedestrian crossing delay at that intersection.

The project will not reduce vehicle delays at intersections such as Cambridgepark Drive/Alewife Brook Parkway and Alewife Brook Parkway/Rindge Avenue. The improvements to eastbound delays on Rt. 2 will move some congestion to these locations.

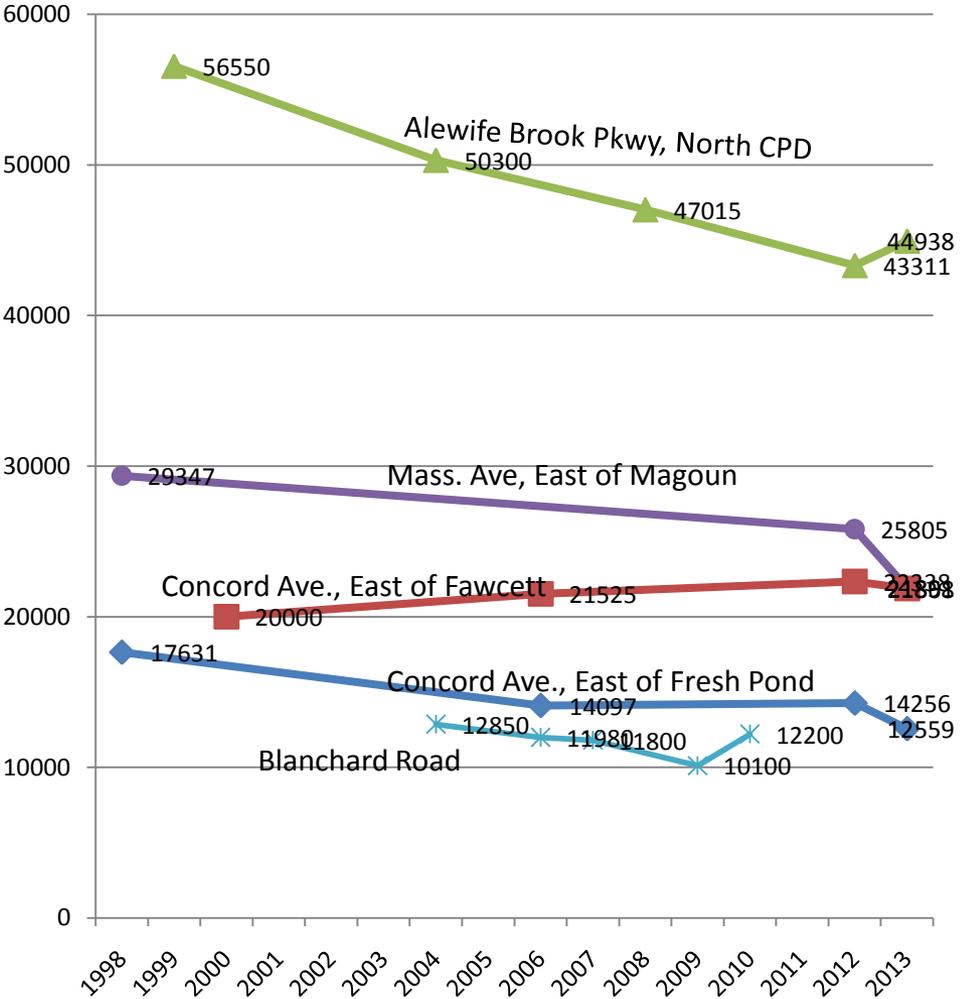
Current Traffic Conditions and Trends in the Area

2013 Average Daily Traffic Volumes

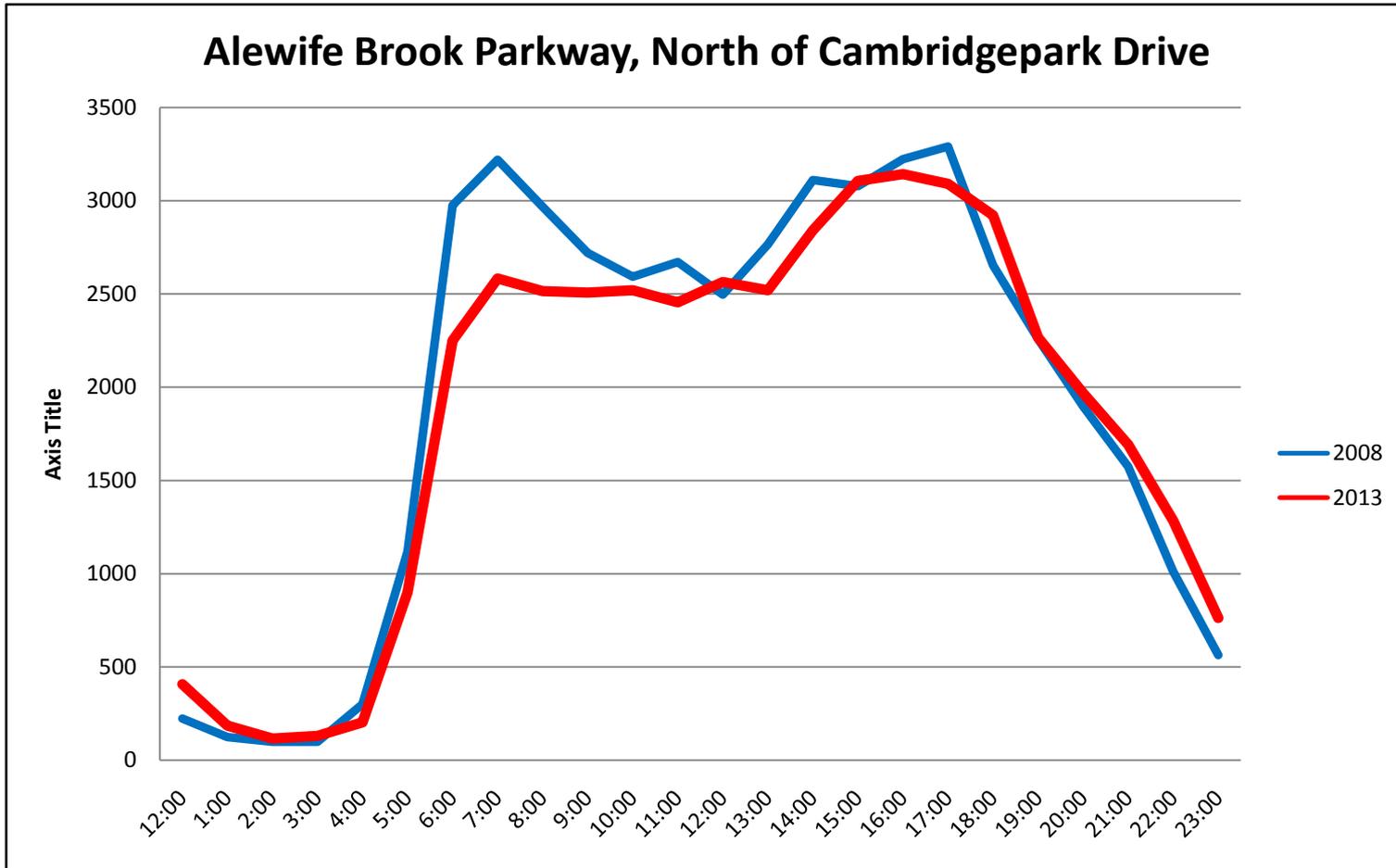


ADT (Average Daily Traffic)

- ▲ Alewife Brook Parkway (North of Cambridgepark Drive)
- Massachusetts Avenue (South of Magoun St)
- Concord Avenue (East of Fawcett St)
- ◆ Concord Avenue (East of Fresh Pond Parkway)
- ✱ Blanchard Road (By Raised Device)

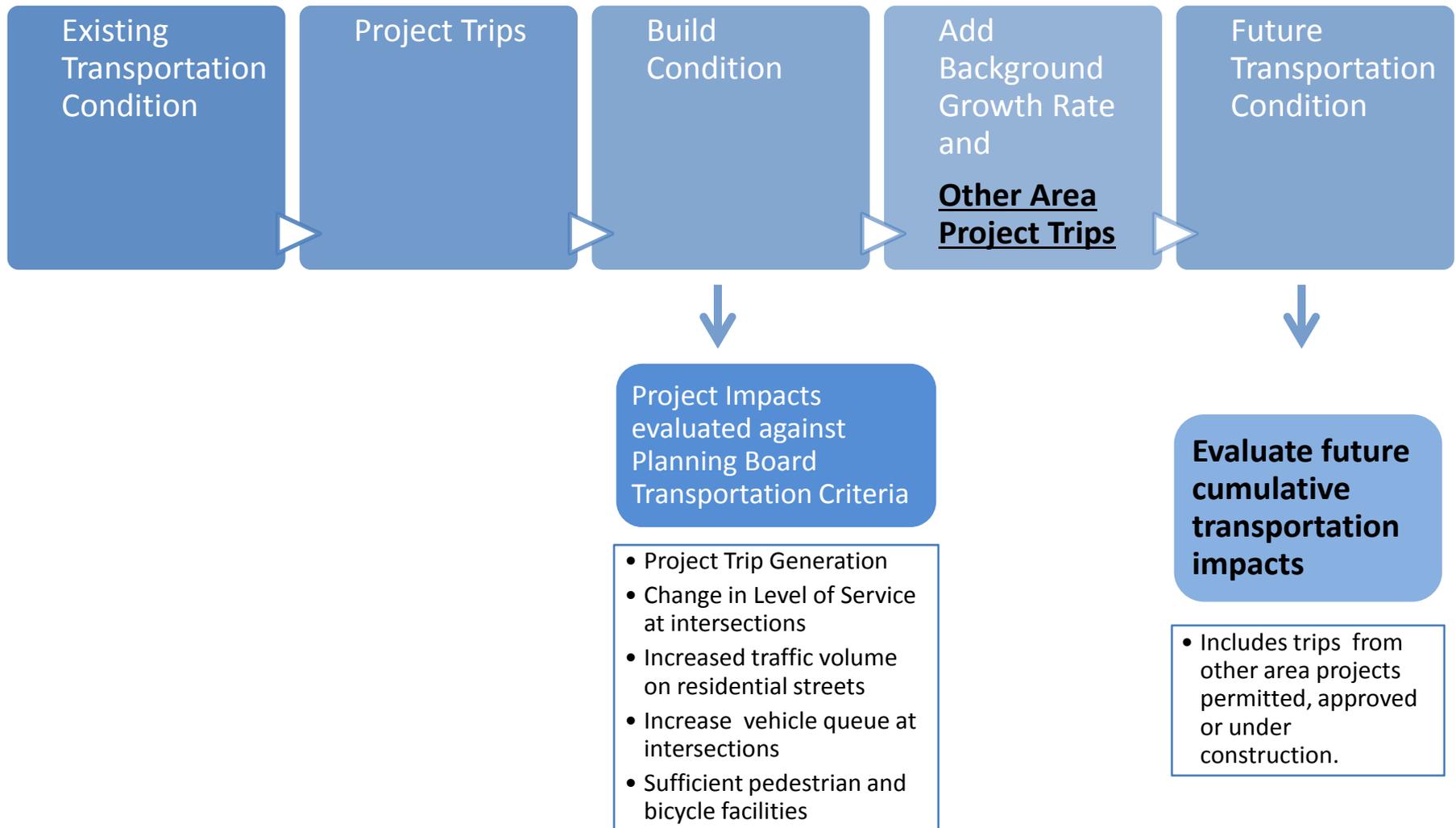


Hourly Variation in Traffic

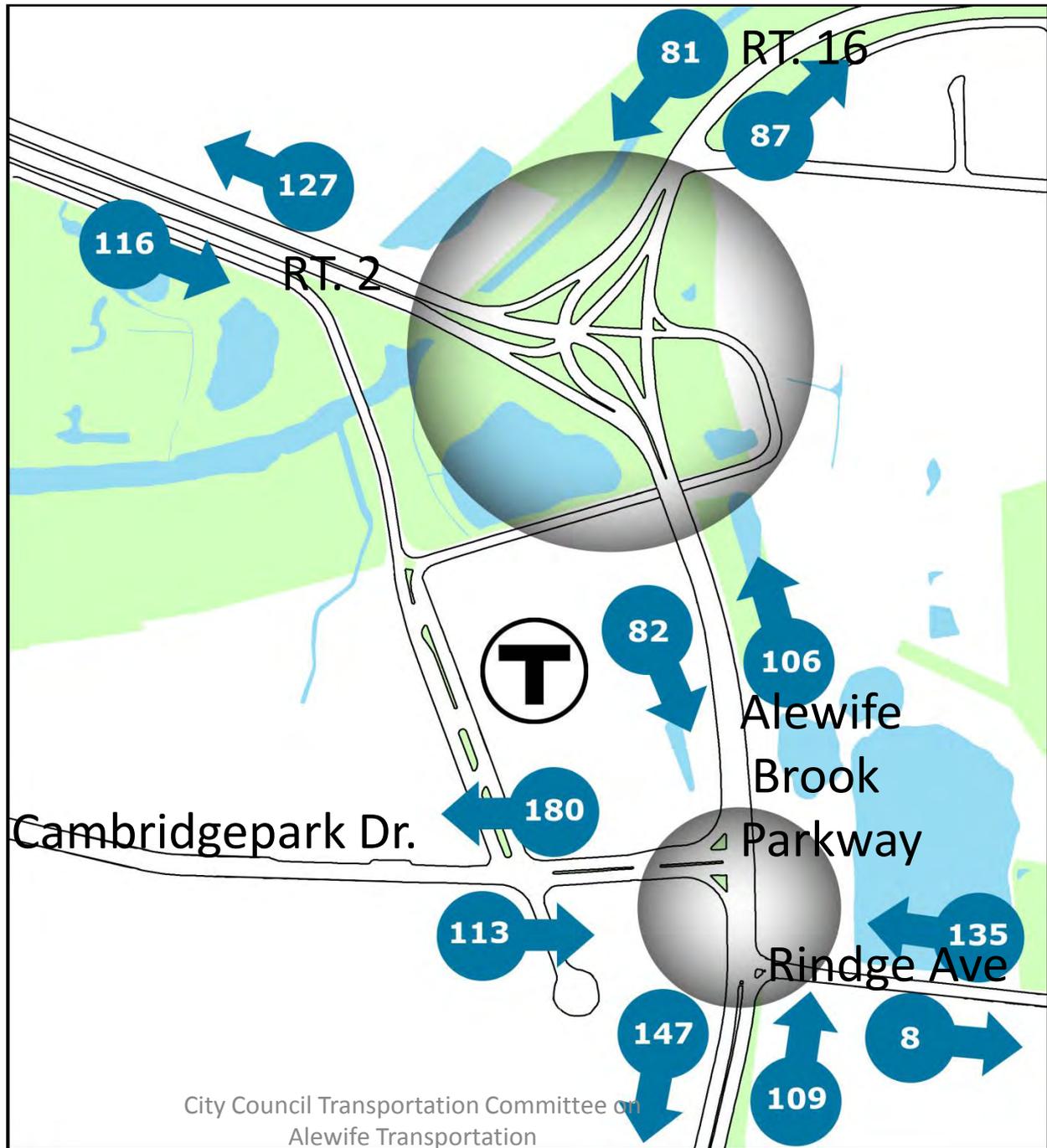


DEVELOPMENT REVIEW PROCESS

Transportation Impact Reports (TIS)



PM Peak
Hour
Cumulative
New Trips



Alewife Current and Proposed Development

- Residential was recommended in Alewife-Concord Plan to support a transit-oriented development and a mixed use neighborhood.
- Residential Use has less trips and better non-auto mode share than office use.

8 Projects in Alewife Area

Project Name	Units	Status
70 Fawcett Street	428	Partly occupied
The Residences at Rt. 2 (Faces site)	227	Partly occupied
603 Concord Ave(Concord/Wheeler Phase I)	61	Under construction
160 Cambridgepark Drive (Hanover)	398	Under construction
165 Cambridgepark Drive (Hines)	244	Under construction
130 Cambridgepark Drive	220	Approved
180R Cambridgepark Drive	378	Under review
75 New Street	93	Under review
Total	2049	



City of Cambridge Department of Public Works

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August 12, 2014

TO: Planning Board

FROM: Katherine F. Watkins, PE
City Engineer

RE: Stormwater Management in the Concord-Alewife Area

The Concord – Alewife area falls within the Alewife Brook sub-watershed of the Mystic River Watershed. The stormwater from this area discharges to the Little River and Alewife Brook, then to the Mystic River and ultimately into the Boston Harbor. Much of the area is located within the 100-Year Flood Plain. The existing public drainage system can adequately convey smaller storm events, however, for intense rainfalls and larger events the system surcharges causing flooding, backups and ponding in various locations throughout the watershed.

Stormwater management associated with development projects is regulated by different entities – Federal, State and Local. The goals of these regulations are to address the quality of the runoff, the quantity of water to be handled, and the rate at which it is discharged to the receiving water body. Development projects provide opportunities to enhance stormwater management by implementing a variety of strategies and techniques such as reducing the amount of impervious coverage; increasing infiltration; increasing storage during storm events; and various methods of treatment before it is discharged.

Development in the 100-Year Flood Plain, as defined by Flood Insurance Rate Maps (FIRMs) issued by the Federal Emergency Management Agency (FEMA), dated June 4, 2010, triggers

- Conservation Commission Review
 - The Commission administers the Massachusetts Wetlands Protection Act (310 CMR 10.0), reviewing, permitting and inspecting projects in or adjacent to Cambridge's wetlands, floodplains and water bodies.
 - The Commission plays an important role in implementing the Massachusetts Stormwater Management Policy and Standards.
 - The Commission reviews and approves the compensatory storage required for any displacement of water retention capacity within the 100-Year Flood Plain.
- Flood Plain Overlay District, 20.70 of Zoning
 - Requires compensatory storage for any displacement of water retention capacity within the 100-year flood plain.
 - Requires documentation that encroachment of the floodway shall not result in any increase in flood levels during the occurrence of the 100-year flood.
 - Requires review of plans by Conservation Commission and the City Engineer.

Development projects are required to meet key stormwater requirements (Massachusetts Stormwater Management Policy and Standards, Cambridge Concord-Alewife Stormwater Management Guidelines, Land Disturbance Regulations, Wastewater and Stormwater Drainage Regulations):

1. 25 to 2 Requirement: This is a Cambridge specific requirement that the post-development discharge hydrograph for the 25-year 24-hour rainfall event must be less than or equal to the 2-year 24-hour rainfall event pre-development. The difference in the runoff volume must be stored or recharged on site.
2. Post-development peak discharge rates cannot exceed pre-development peak discharge rates. This must be verified for the 2-year, 10-year, 25-year and 100-year 24-hour storm events.
3. Loss of annual recharge to groundwater shall be eliminated or minimized.
4. Remove 80% of the average annual post-construction load of Total Suspended Solids (TSS).
5. Manage construction-related erosion and sedimentation during construction.
6. Develop and implement long-term operations and maintenance plan.

These requirements are typically met through a variety of measures: infiltration systems, porous asphalt, bio-retention areas (including rain gardens), green roofs, proprietary media filters, deep sump catch basins, on-site stormwater storage, etc. Regular maintenance and documentation is required to ensure that the improvements continue to function as designed.

Looking Forward:

As we look to make the city more resilient under climate change conditions, staff has worked with developers to modify designs to reduce the likelihood of flooding impacting residents.

Specific to 88 CambridgePark Drive

- The 100-Year Flood Plain Elevation, per FEMA, is 18.44. The first floor of the building is raised to Elevation 20.00.
- The first floor provides for amenities, reception and bike storage.
- Residential units are located on the second floor and higher, above both the 100-Year and 500-Year flood elevations.
- Key electrical equipment is elevated above the 100-Year flood elevation.

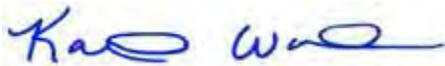
These modifications will reduce the likelihood of flooding and enhance the project's resiliency by keeping residents and key electrical equipment at higher elevations.

Climate Change Vulnerability Assessment (on-going) : The first step to making Cambridge more prepared and resilient to climate change is to understand how we are vulnerable or resilient in terms of impacts on people, infrastructure, public health, and the economy. The City of Cambridge is undertaking a climate change vulnerability assessment, which will run through 2014 and serve as the foundation for a climate change preparedness plan.

The project is coordinated by an inter-departmental steering committee consisting of the Public Works, Public Health, and Community Development Departments. A consultant team led by Kleinfelder, a Cambridge based architecture, engineering, and sustainability services firm, is working with City staff to perform the assessment. The vulnerability assessment will provide projections of future flooding risks for the Alewife Brook watershed and provide the basis for preparedness planning to evaluate a wide range of options for improving our resiliency.

The Department of Public Works has reviewed the Notice of Intent, the Stormwater Guidelines and will work with the developer through the building permit process to finalize the Stormwater Management Plan.

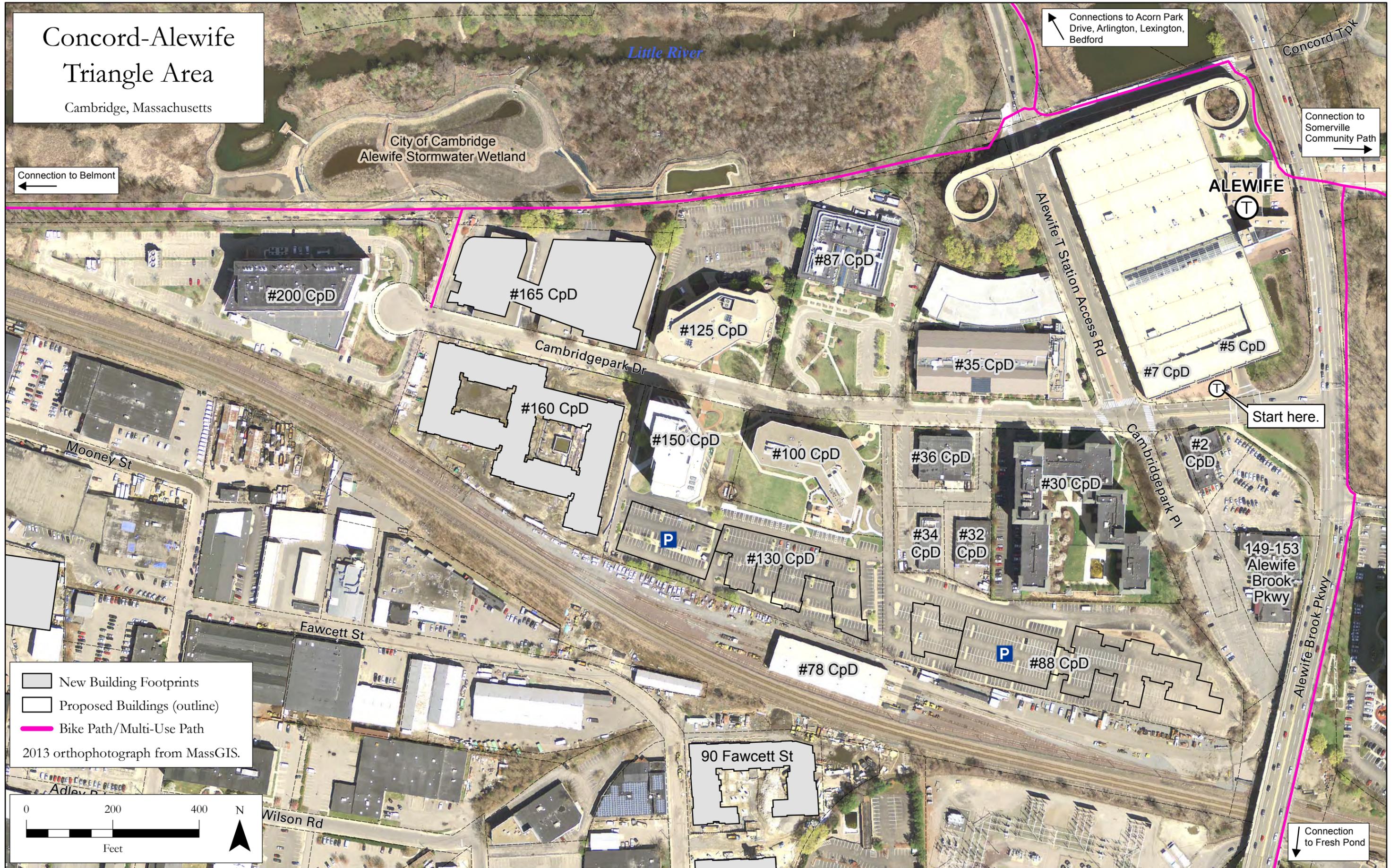
Sincerely,

A handwritten signature in blue ink, appearing to read "Katherine F. Watkins". The signature is fluid and cursive, with a large initial "K" and "W".

Katherine F. Watkins, P.E.
City Engineer

Concord-Alewife Triangle Area

Cambridge, Massachusetts



Connection to Belmont
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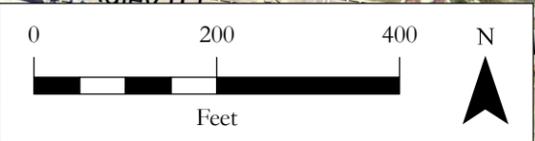
Connections to Acorn Park Drive, Arlington, Lexington, Bedford
↖

Connection to Somerville Community Path
→

Start here.

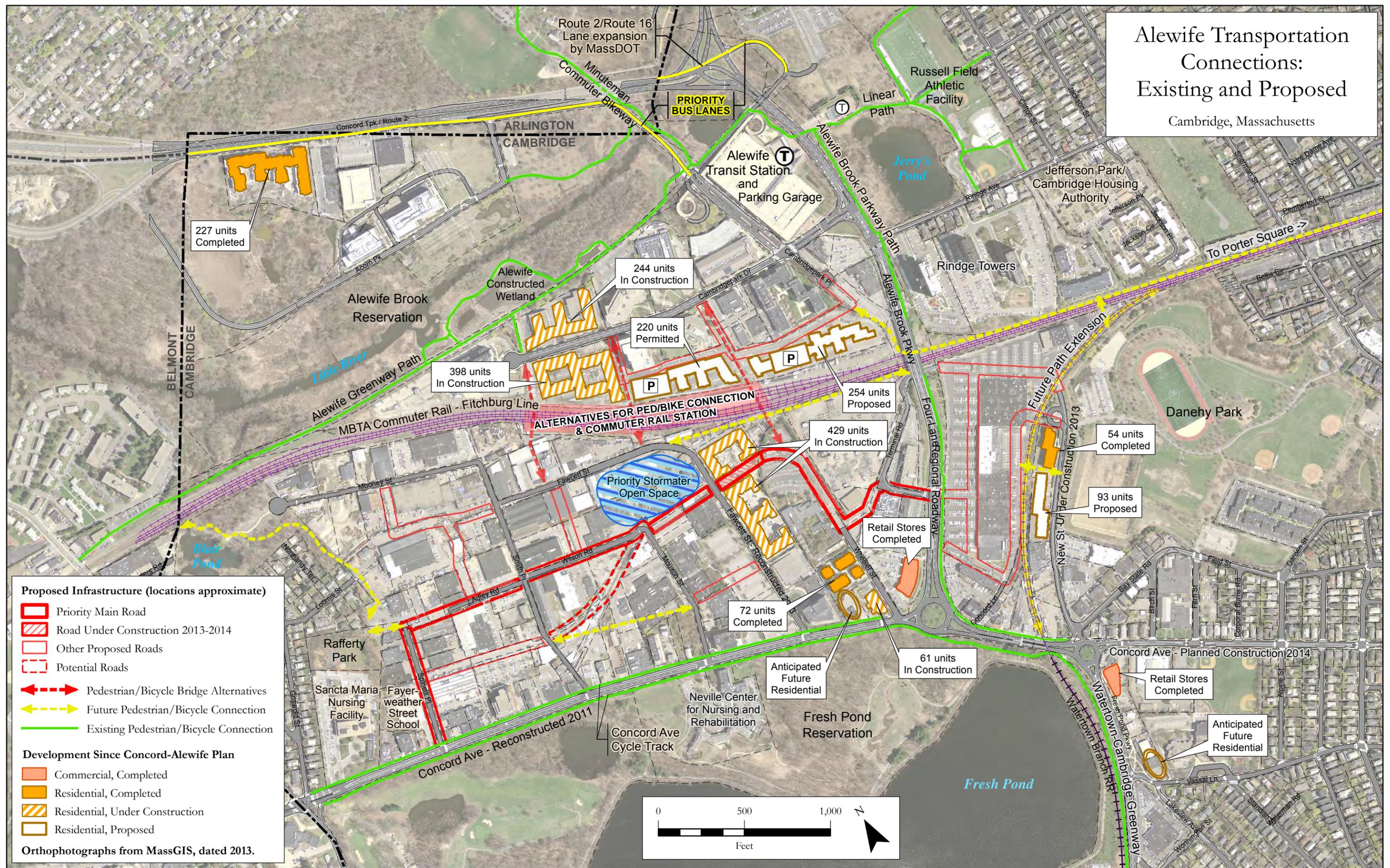
Connection to Fresh Pond
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- New Building Footprints
 - Proposed Buildings (outline)
 - Bike Path/Multi-Use Path
- 2013 orthophotograph from MassGIS.



Alewife Transportation Connections: Existing and Proposed

Cambridge, Massachusetts



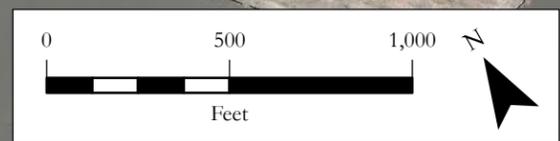
Proposed Infrastructure (locations approximate)

- Priority Main Road
- Road Under Construction 2013-2014
- Other Proposed Roads
- Potential Roads
- ↔ Pedestrian/Bicycle Bridge Alternatives
- ↔ Future Pedestrian/Bicycle Connection
- ↔ Existing Pedestrian/Bicycle Connection

Development Since Concord-Alewife Plan

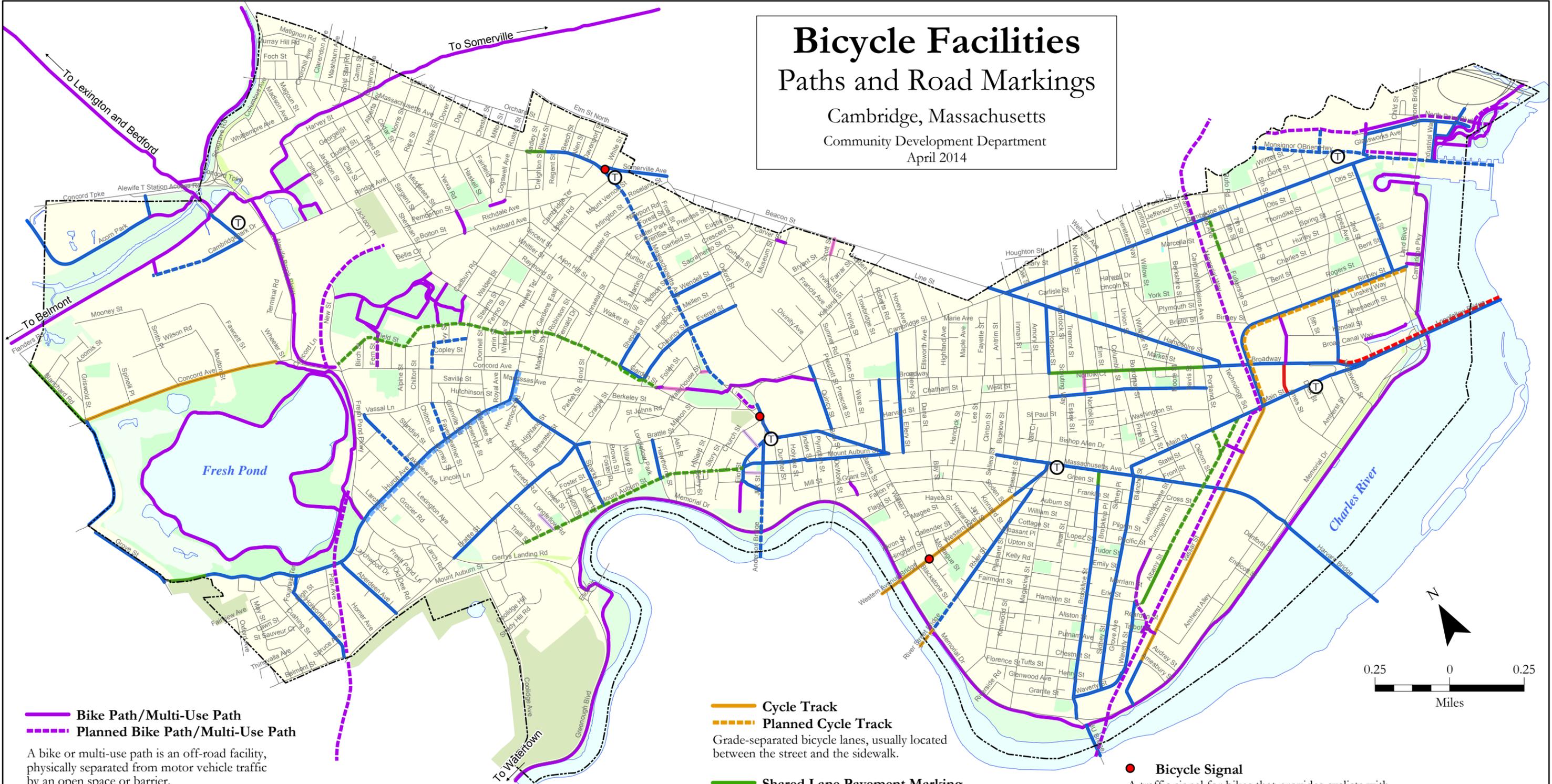
- Commercial, Completed
- Residential, Completed
- Residential, Under Construction
- Residential, Proposed

Orthophotographs from MassGIS, dated 2013.



Bicycle Facilities Paths and Road Markings

Cambridge, Massachusetts
Community Development Department
April 2014



Bike Path/Multi-Use Path
Planned Bike Path/Multi-Use Path

A bike or multi-use path is an off-road facility, physically separated from motor vehicle traffic by an open space or barrier.

Bike Lane
Planned Bike Lane

A lane on a street restricted to bicycles and designated by means of painted lines, pavement coloring, bicycle symbols, or other appropriate markings.

Planned Buffered Bike Lane
A bike lane on a street that is separated from the parking lane by open space that is indicated by pavement markings.

Protected Bike Lane
Planned Protected Bike Lane

A bike lane at street level with physical protection from passing motor vehicle traffic, such as a parking lane or other barrier. Sometimes referred to as an at-grade cycle track.

Contra-flow
A contra-flow lane is a bicycle facility marked to allow bicyclists to travel against the flow of traffic on a one-way street.

Cycle Track
Planned Cycle Track

Grade-separated bicycle lanes, usually located between the street and the sidewalk.

Shared Lane Pavement Marking
Planned Shared Lane Pavement Marking

A bicycle symbol marked on the pavement intended to remind motorists that bicyclists share the road. Used when there is insufficient space for bicycle lanes and specific bicycle markings are desired.

Shared Street
A street that is created as a common space to be shared by pedestrians, bicyclists, and low speed motor vehicles, all at the same level without grade-separated sidewalks.

Bicycle Signal
A traffic signal for bikes that provides cyclists with their own signal phase, enabling them to more safely and conveniently cross intersections.

This map is for planning purposes and is subject to change. It is not a route map. Bicycles are encouraged to use all streets within the city. Updated versions of this map will be posted on the city website.

For more information on city bike programs, go to:
www.cambridgema.gov/home/CDD/Transportation/gettingaroundcambridge/bybike.aspx