

4. INTRODUCTION

Retail will play an important role in helping to define the success of the Concept Plan by enlivening the streetscape and establishing the Project's relationship with the surrounding community. The ground floors of all proposed buildings will be designed to accommodate functional active use space, which may include retail where appropriate. Further, buildings that are not part of the Concept Plan—including 105 Broadway, 150 Broadway and the Broadway side of the 255 Main Street—are contemplated in this plan as future potential retail in order to offer additional context to envision Broadway as a retail corridor.

The following goals will be pursued when designing the retail program:

- Locating retail in visible well-traveled areas that will help ensure its viability.
- Examining the broader market mix of current and proposed retail in Kendall Square to ensure that potential retailers are complementary of existing offerings
- Identifying retailers that can serve the diverse, 24/7 needs that come with a mixture of residential and commercial development from convenience and consumer service retail to place making dining offerings
- Selecting retailers with a viable business model and material operational experience
- Creating a retail program consistent with the requirements of Article 14

In order to realize the goals above, the Project as a whole needs to be designed to ensure retail is viable by directing major pedestrian and bicycle access corridors to and past proposed retail locations. This important design guideline will help reinforce the City's chosen retail corridors along Broadway and create a dynamic and enlivened streetscape.

Further, the potential program needs to reflect the existing and newly proposed retail in other projects in Kendall Square to minimize programmatic redundancy and potential market conflicts. For example, it is commonly agreed that Kendall Square would benefit from a grocery store or pharmacy. As of the date of this submission, it is understood that the MIT NOMA SOMA project is actively pursuing both a grocery store and a pharmacy. Accordingly, the Concept Plan does not contemplate a grocery store or pharmacy at this time, as it would directly conflict and potentially impair the future success of the planned MIT grocery and pharmacy.

4.1 EXISTING RETAIL

The Kendall Square retail market is composed of a diverse mix of offerings, the majority of which are food and beverage establishments. In addition, the majority of the retailers in the area are local or independent, as opposed to national chains. The existing retail in and around Kendall Square can be divided into uniquely defined zones offering a different mix of tenants and retail experiences. This context will help inform the retail planning within the Project.

MAIN STREET

The area along Main Street in proximity to the Kendall Square MBTA Red Line stop is composed mostly of restaurant, bars and fast casual offerings split between local retailers and national chains. The restaurants are defined by a diversity of culinary offerings that serve the local neighborhood and visitors alike. In addition Kendall Square features boutique and national hotels as well as the MIT Coop bookstore.

BROAD STREET AND THIRD CANAL

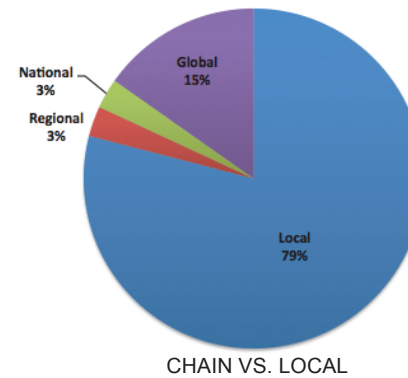
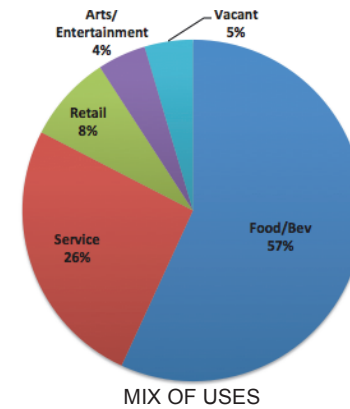
This developing retail area features a mix of restaurants with abundant outdoor seating situated along a landscaped plaza.

ONE KENDALL SQUARE

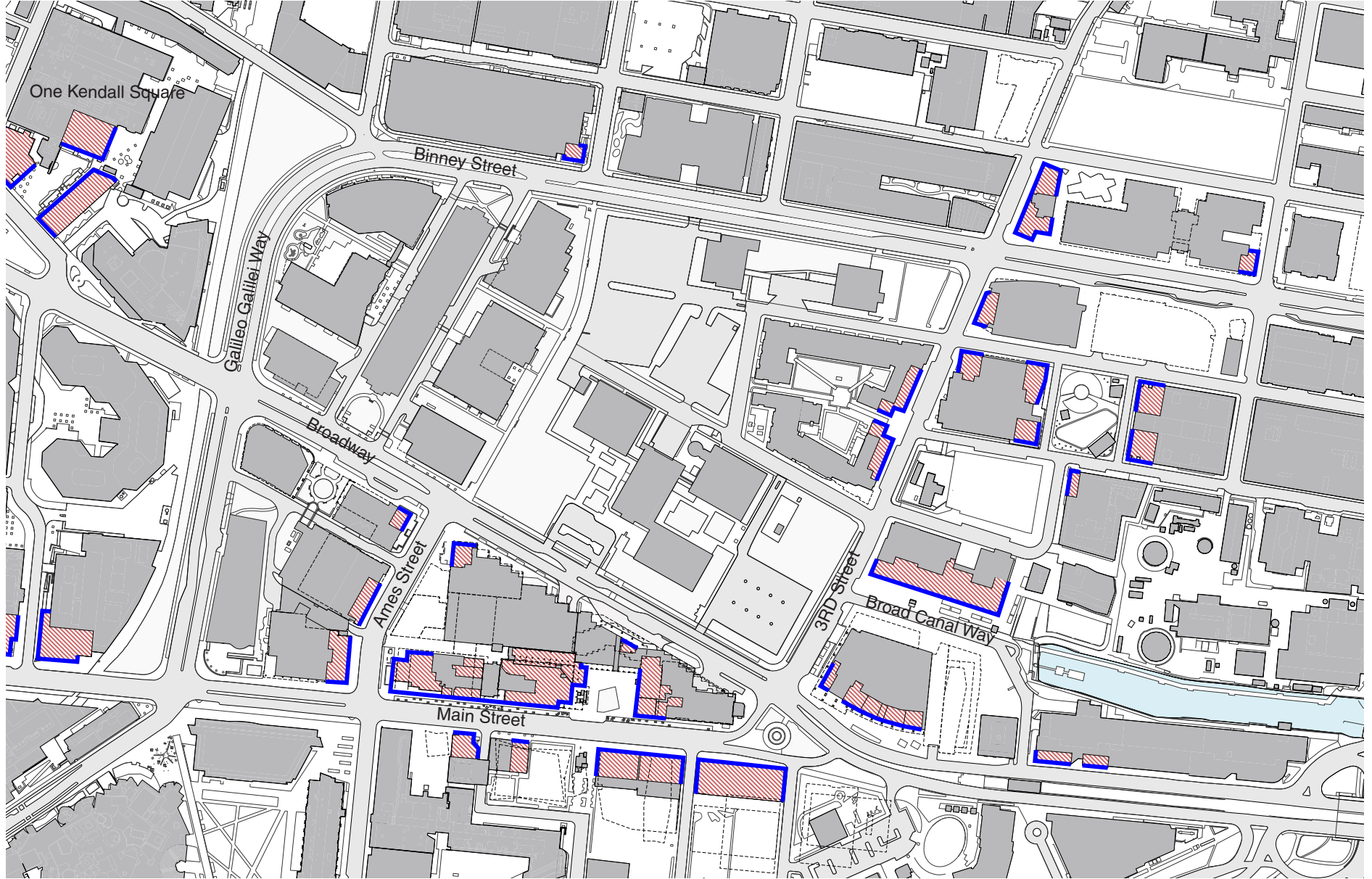
The area around the mixed use One Kendall Square project includes a movie theater, mix of restaurants and a brew pub.

CAMBRIDGESIDE GALLERIA

The nearby Cambridgeside Galleria is a traditional anchored retail mall with established national chains offering apparel, electronics, consumer goods and fast casual dining.



*The graphics and analysis above are provided by Graffito SP



 Existing Retail

DISTRICT EXISTING RETAIL

4.2.1 TARGET RETAIL OPPORTUNITIES BY BUILDING:

The following descriptions of potential retail and active use space attempts to offer context to the future retail program for long range planning purposes. The market conditions, retail concepts and needs of the Cambridge community will evolve between the time of this submission and the delivery of physical, ready to lease, retail space.

COMMERCIAL BUILDING A (145 Broadway)

145 Broadway contains two active use spaces that could accommodate retail uses. The larger, approximately 8,317 GFA space is located on the corner of Broadway and Galileo with potential entrances and visibility on both streets. The space could be maintained as one retail suite or subdivided into two or more smaller retail suites offering a range of flexible configurations. The space will be designed with the necessary infrastructure to include a restaurant or bar, as well as dry good uses to allow for programmatic flexibility. Potential uses could include restaurant and/or bars including casual dining options, consumer service retail and dry goods. The eastern side of the building contains one, smaller retail space consisting of approximately 1,756 GFA facing Broadway park. This space will benefit from proximity and connection to the proposed park and potential uses could include, but are not limited to, a café or coffee shop, fast casual restaurant space and convenience retail potentially including a sundry store, barber shop or salon.

COMMERCIAL BUILDING B (250 Binney Street)

250 Binney contains an active use zone situated along the 6th street connector and fronting Binney Street. The approximately 8,000 GFA space could be a contiguous use or divided into an approximately 3,000 GFA retail suite fronting Binney and an approximately 5,000 GFA active use space fronting the 6th Street connector that could be used for active space in the near term and repurposed to retail in anticipation of a potential redevelopment of the Volpe site. The space will be designed in anticipation of the necessary infrastructure to accommodate restaurant and bar users as well as dry good uses to allow for programmatic flexibility. Depending on the future configuration, potential uses may include, but are not limited to, restaurant or bars, casual dining, bicycle oriented retail, consumer service or convenience retail.

4.2.1 POTENTIAL FUTURE RETAIL

For clarity, the following potential retail spaces are not formally part of the Concept Plan. Both spaces are currently leased to long term tenants with no plans to convert their ground floors to retail uses. However, in the interest of long term planning and context, they are presented as potential future retail spaces to help further the understanding of how Broadway could evolve into a more active retail corridor.

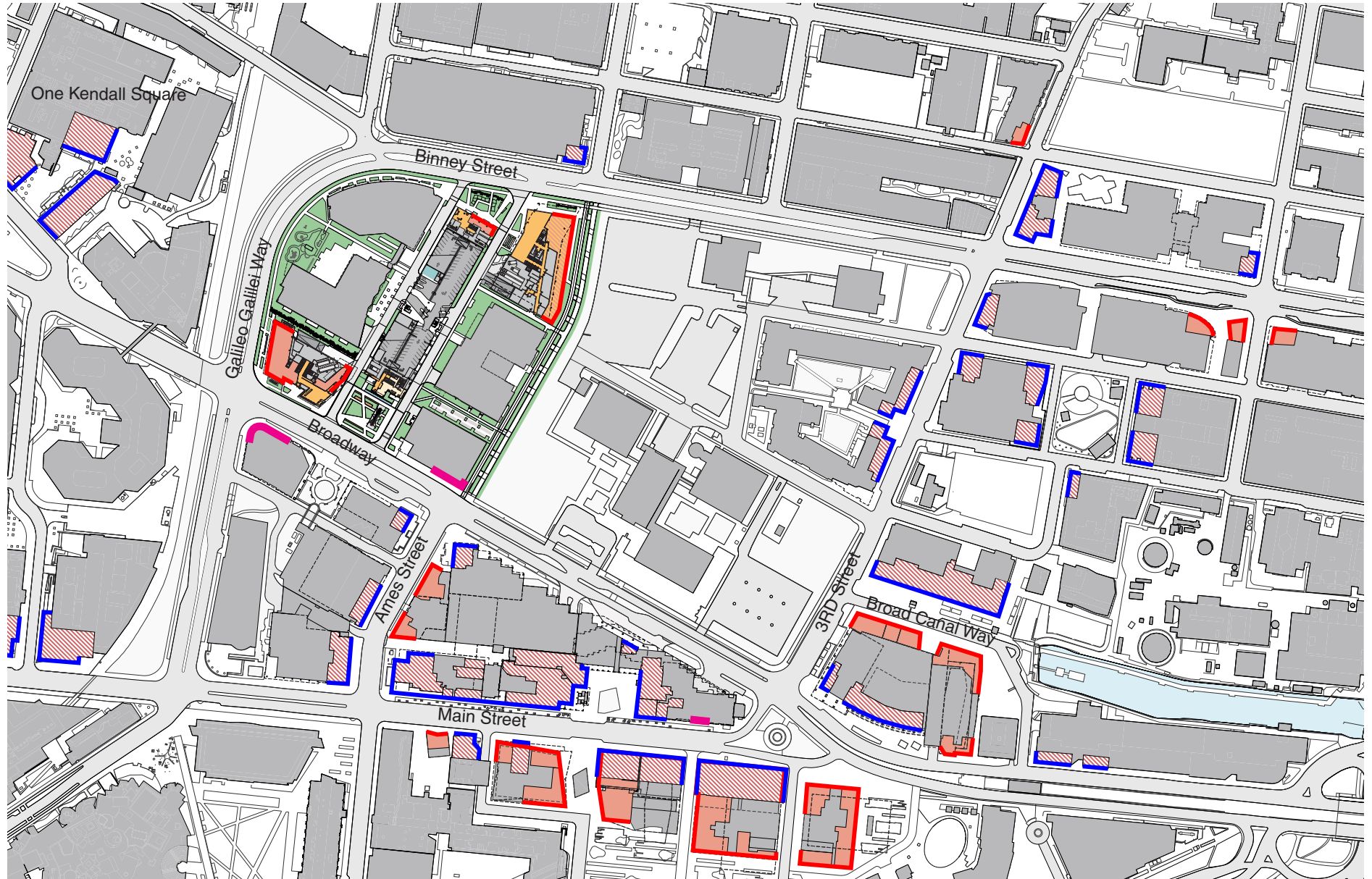
105 Broadway

The ground floor space shown at 105 Broadway on the Future Retail Exhibit offers context for where potential retail and active uses could be located. While 105 Broadway benefits from pedestrian traffic along Broadway and the 6th Street connector, the potential future retail would be elevated above the street. The challenges of visibility and code compliant access would have to be addressed in future design.

150 Broadway

The potential future retail space at 150 Broadway benefits from visibility along both Broadway and Galileo as well as immediate access to the Danny Lewin Park. Similar to 105 Broadway the finished floor elevations would be located above the street elevation presenting access and visibility challenges that would need to be addressed.

4.2 FUTURE RETAIL PLAN



- Existing Retail
- Proposed Retail
- Future Potential Retail

FUTURE RETAIL PLAN

4.2.2 IMPLEMENTATION AND POINT OF CONTACT

The Applicant initially designates Michael Tilford, Project Manager – Development, as the point of contact for monitoring and implementation of retail planning. He can be reached at mtilford@bostonproperties.com

4.2.5 MONITORING

The Applicant will initially meet annually with the CRA and at least twice each year after the issuance of a building permit to discuss the retail market, new retail concepts, emerging local and independent retailers, and general leasing activity.

4.2.3 INCENTIVES FOR LOCAL RETAIL

In an effort to ensure the goals outlined above and the requirements outlined in Article 14 for local and independent retailers, the Applicant may consider certain economic incentives depending on market conditions and the location of the space. The following economic incentives may be explored and included in a lease with a desirable local or independent retailer:

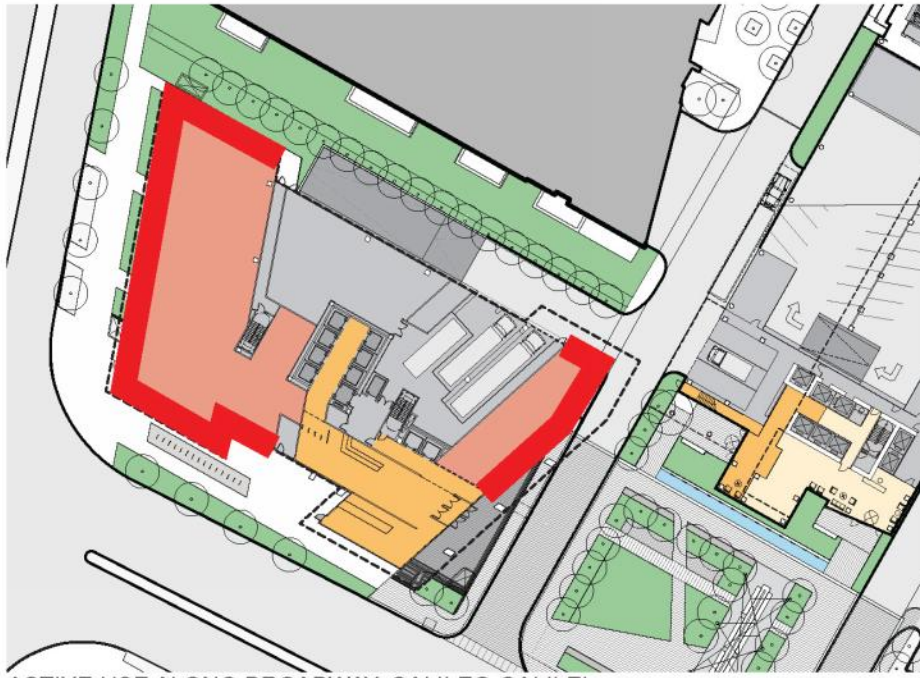
- Rent that is set below the market rent for national chains
- Flexible initial lease durations and extension options
- Tenant Improvement allowances
- Using a percentage of sales structure as part of the total rent

4.2.4 STREET ACTIVATION APPROACH

145 BROADWAY STREET ACTIVATION

The ground floor of 145 Broadway Street is designed with an emphasis on capitalizing on the close relationship the building has with the proposed Broadway Park, in addition to taking advantage of the relatively high volume of pedestrian traffic along the major public street conditions provided by Broadway Street and Galileo Galilei Way. The following items highlight the street activation approach:

- Ground level plaza to continue the public realm from Broadway Park along Broadway Street, wrapping around the corner to Galileo Galilei Way.
- Presence of the plaza will allow for the active use indoor program to spill outdoors.
- Presence of the plaza will allow for high visibility for the active use program.
- Active use space at the corner of Broadway and Galileo Galilei Way, with entry points along Galileo Galilei Way, will anchor the ground floor activity, activating the street corner.
- Service and loading is accessed along the northern side of the site, accessed from West Service Road, hidden away from major pedestrian paths and ground floor activity along Broadway.
- Use of transparency to maximize the visual connection between pedestrians and the active use spaces.



ACTIVE USE ALONG BROADWAY, GALILEO GALILEI



LOOKING NORTHWEST TOWARDS ACTIVE USE ALONG BROADWAY PARK

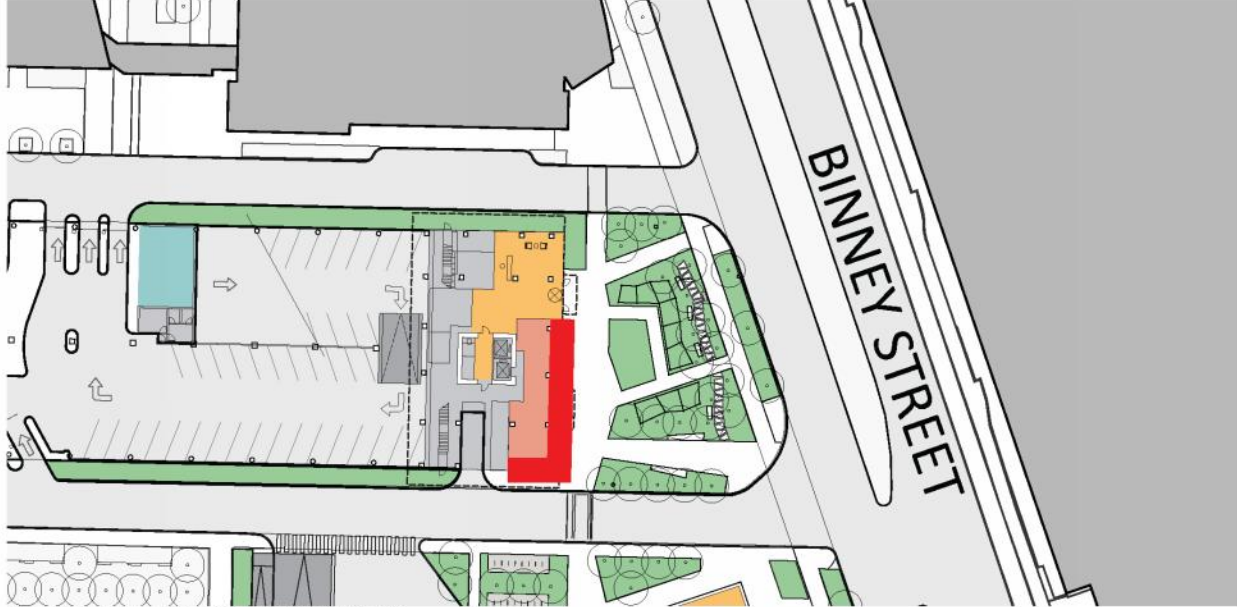


LOOKING NORTHEAST TOWARDS ACTIVE USE ALONG

RESIDENTIAL BUILDING NORTH (BLUE GARAGE)

The ground floor of Residential Building North has been designed to activate the streetscape fronting Binney Park through an active lobby as well as space dedicated to active use or retail. The following items will highlight the street activation approach:

- Presence of Binney Park will afford high visibility for the active use program.
- Binney Park will allow for the active use indoor program to spill outdoors.
- Service and loading function will occur along East Service Road, away from major pedestrian paths and ground floor activity along Binney Street.
- Use of transparency to maximize the visual connection between pedestrians and the active use spaces.



ACTIVE USE ALONG BINNEY PARK



LOOKING SOUTHEAST TOWARDS ACTIVE USE ALONG

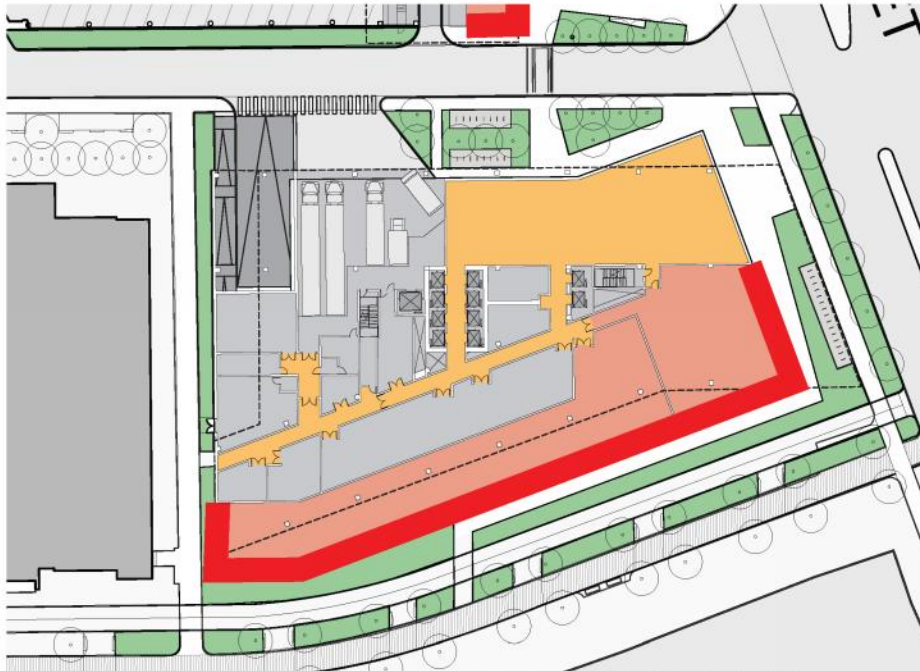
COMMERCIAL BUILDING B (250 BINNEY STREET)

The ground floor of 250 Binney Street is designed for the possibility of active ground floor use or retail on Binney Street and 6th Street Connector frontage. Both Binney Park and the 6th Street Connector are seen as important public realm elements that will catalyze and be catalyzed by proposed active use spaces, if viable.

Active use/retail spaces fronting Binney Street and the 6th Street Connector, when viable.

Service and loading is tucked away along East Service Road, away from major pedestrian paths and ground floor activity along Binney and 6th Street Connector.

Use of transparency to maximize the visual connection between pedestrians and the active use spaces.



ACTIVE USE ALONG BINNEY STREET AND 6TH STREET CONNECTOR



LOOKING SOUTHEAST TOWARDS ACTIVE



LOOKING SOUTHWEST TOWARDS ACTIVE USE ALONG BINNEY STREET AND 6TH STREET CONNECTOR

105 BROADWAY & 150 BROADWAY

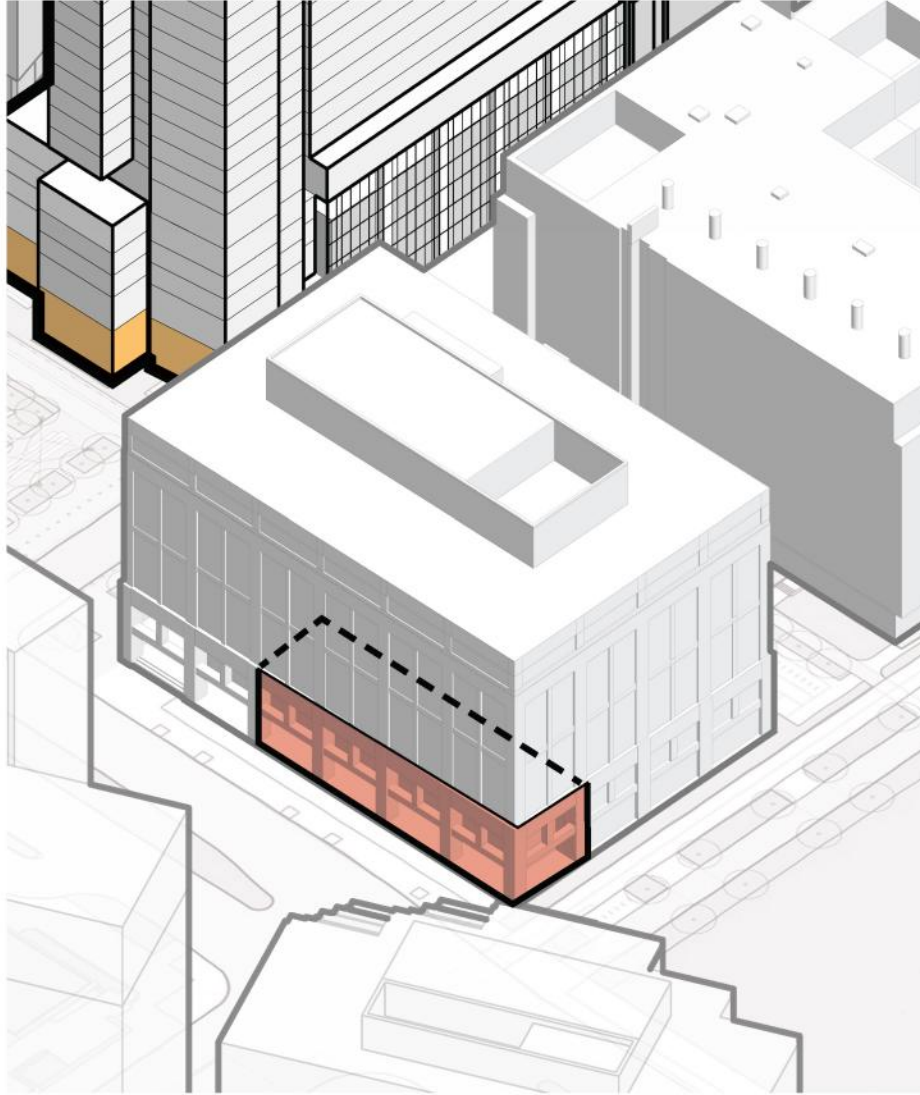
In addition to the proposed active use programming mentioned in previous sections, additional spaces in 105 Broadway and 150 Broadway were taken into consideration for a holistic view of the future of the retail environment. The inclusion of these two additional spaces as active use spaces will only serve to augment the vision of Broadway as an active retail corridor.

105 BROADWAY

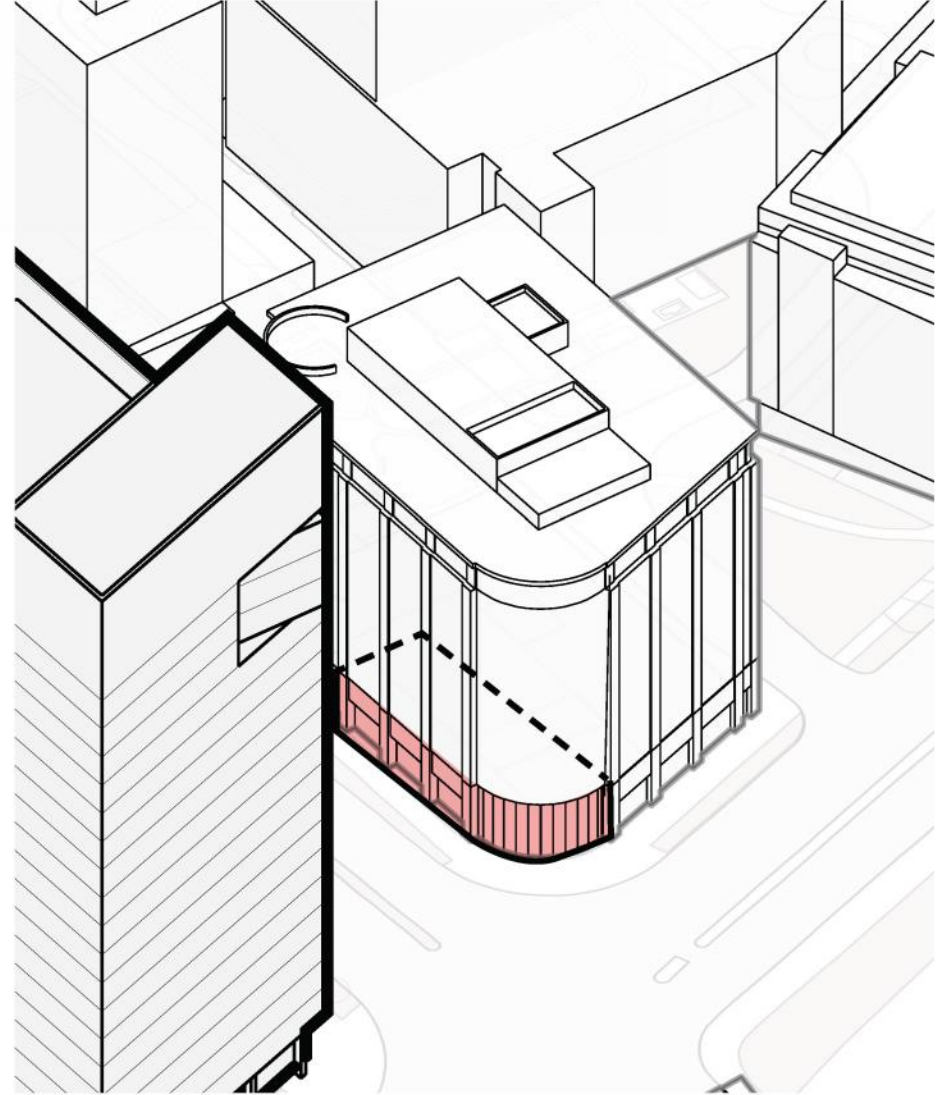
- Potential opportunity to “book-end” public realm of the Broadway Park with an active use space, should this become viable at some point in the future.
- Close relationship to 6th Street Connector and outdoor space provided and the proposed active use space in 250 Binney Street Building.
- Opportunity to activate the corner of project parcel (at Broadway and 6th Street Connector).

150 BROADWAY

- Opportunity to create an active use and retail corridor “gateway” from corner of Galileo Galilei and Broadway.
- High visibility location being on two major public streets.



FUTURE ACTIVE USE IN 105 BROADWAY



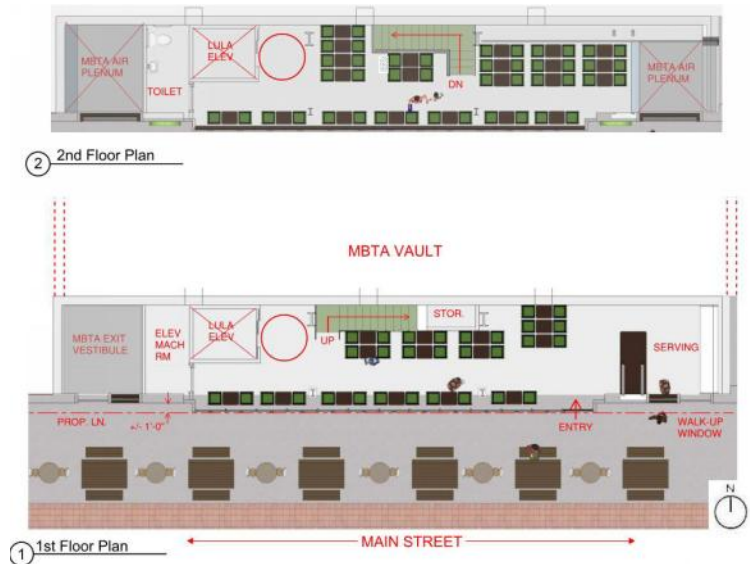
FUTURE ACTIVE USE IN 150 BROADWAY

255 MAIN STREET (IN PLANNING STAGES)

255 Main Street contains a void space consisting of approximately 1,000 GFA situated behind existing venting louvers that were formerly part of MBTA infrastructure. While the space benefits from its prominent location on Main Street, it is also shallower than a typical retail suite. Potential uses could include, but are not limited to, fast casual dining, a bar, gift shop or consumer service retail like a drycleaner.

Broadway Facing Retail: At some point in the future the lobby of the Marriott Hotel could be reconfigured to include retail. Depending upon the design and program, some retail may be located northwest of the existing loading dock.

- Active use space on Main Street with outdoor cafe seating
- Use Awning to reinforce tenant identity
- Take advantage of existing pedestrian volumes and traffic



4.3 ECONOMIC FEASIBILITY

RETAIL MARKET OVERVIEW

With proximity to MIT and densely populated surrounding neighborhoods, existing Kendall Square retailers benefit from strong market fundamentals, proximity to diverse population groups and major infrastructure including:

- 22,000 students faculty and staff at MIT.
- Over 1,700 apartment homes within a 5 minute walk from Main Street.
- The Kendall MBTA Redline station.
- An average household income of \$113,022 within a 1 mile radius.
- A residential population of 57,874 within 1 mile.
- A robust and diverse group of employers.
- A Walk Score of 81 and a bike score of 89 indicating broad and uninhibited circulation around the area.

While the local market has promising contributing elements, retail activity is largely concentrated on Main Street, Binney and Third Street and Broad Canal Way. The area immediately surrounding the project remains an aspirational retail corridor without the benefit of established activity. Accordingly, retail must be thoughtfully pursued in phases that depend upon the timing of delivery for individual projects and based upon the goals and guidelines outlined above.

According to the American Community Survey "ACS," the most accurate and up-to-date census data from 2015, Kendall Square has the following demographic profile:

Radius	1/2-Mile	1-Mile
Residential Population	4,610	57,874
Avg. Household Income	\$91,251	\$113,022
Median Age	31.2	31.5
Bachelor's Degree (or higher)	79.7%	76.7%



Diagram courtesy of CBT Architects

2015 CENSUS DATA OF KENDALL SQUARE



KENDALL SQUARE BASE RENTS

*The graphics above were provided by Graffito SP

A blue-tinted photograph of a city street intersection. In the foreground, a traffic light pole extends across the frame, featuring a sign that reads "CROSSWALK STOP ON RED". Below the sign, a white car is stopped at the intersection. A pedestrian is walking across the crosswalk, and another person is walking a dog. In the background, there are trees and a modern building with a "Walmart" sign. The sky is bright with scattered clouds.

5. TRANSPORTATION

5. INTRODUCTION

This section describes the existing and proposed transportation conditions surrounding the Project Site and presents an overview of the Traffic Impact Study (TIS) conducted to assess potential traffic impacts associated with the Project. The TIS, dated June 23, 2016, was Certified by the City of Cambridge Traffic, Parking and Transportation (TP&T) Department on July 14, 2016. Refer to Appendix B for a copy of the Certification.

5.1 CERTIFIED TIS OVERVIEW

As required by Section 14.32.2.1(5) of the zoning ordinance, a TIS was prepared for the Project in conformance with Section IV, “Guidelines for Presenting Information to the Planning Board” of the City of Cambridge “Transportation Impact Study Guidelines,” Sixth Revision dated November 28, 2011. The TIS responds to the Scoping Letter dated May 19, 2016 issued by the TP&T Department in response to a Request for Scoping dated April 19, 2016. A copy of the full TIS, including the City’s scoping letter (which is included in the TIS technical appendix) is provided in Appendix B.

The TIS document consists of three components, as follows:

- Introduction and Project Overview, describing the framework in which the transportation component of this Project was evaluated;
- Transportation Impact Study, presenting the technical information and analysis results as required under the guidelines; and
- Planning Board Special Permit Criteria, summarizing the evaluation of the Project as defined under the guidelines.

The TIS includes inventories of physical and operational conditions in the study area including roadways, intersections, crosswalks, sidewalks, on-street and off-street parking, transit facilities, and land uses. Transportation data is presented, including automatic traffic recorder counts, intersection turning movement counts, pedestrian and bicycle counts, vehicle crash data, and transit service data. Traffic volumes were evaluated for a 2016 Theoretical Existing Condition, a 2016 Build Condition, and a 2021 Build Scenario Loading that include future background growth and other developments, as well as Project trips, and off-site roadway improvements. The required TIS Summary Sheets and Planning Board Criteria Performance Summary are included in Appendix B.

The TIS analysis identified impacts that the Project will have on the transportation network and is used by the City to identify possible mitigation to offset these impacts. Applicant, the CRA and the City are continuing the process of developing and discussing the mitigation program associated with this Project. The TIS identified policies and programs that could potentially be implemented as Project mitigation.

5.2 KENDALL SQUARE TRANSIT ENHANCEMENT PROGRAM (KSTEP) TDM PLAN

The CRA and Applicant remain focused, as they have been throughout the development of Kendall Center, on preserving and enhancing the favorable transportation mode split in Kendall Square that has played such an important role in the successful redevelopment of the KSURP area. It is acknowledged and well-documented that approximately 70 percent of all trip making in Kendall Square utilizes transit, walking, biking, shuttle and carpool. This remarkable factor is at the core of the opportunity for the Project. The importance of preserving and enhancing this condition cannot be overstated and is central to the CRA's plans for expansion of the KSURP.

The CRA and Applicant, in conjunction with the City and State are committed to developing an expanded program of transportation enhancements designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to support local efforts to further reduce the vehicle trips generated as a result of the Project and the broader Kendall Square area. The Kendall Square Transit Enhancement Program (KSTEP) will be developed in conjunction with the many stakeholders engaged in transportation planning and operations in Kendall Square, including the MBTA, MassDOT, and others.

The CRA and Applicant have engaged in multiple discussions with MassDOT and the MBTA regarding the Project, its impacts, and potential transportation mitigation and enhancements in the Kendall Square area. A range of issues have been identified and potential improvement opportunities considered for inclusion in the KSTEP. The KSTEP would be designed to enhance access to and mobility around Kendall Square, which the CRA believes is critical to the long-term economic success of the area. It is expected that the KSTEP will be focused on major transportation initiatives that will improve the existing transit options, as shown in Figure 5.1, and services in Kendall Square. They will include a range of projects, programs, and services directed at improving and enhancing transit and related options for people working, living, and visiting the Kendall Square area. The KSTEP would focus on enhancements to transit. Transit and transit-related improvements options to be considered would include both capital and operational investments that would result in service level improvements and capacity expansion in Kendall Square.

The CRA and Applicant recognize that the development of the KSTEP will require detailed consideration and analysis of the enhancement alternatives as well as careful coordination with the stakeholders and service providers. The CRA believes that this analysis can be undertaken by a Working Group,

which would include the CRA, Applicant, the MBTA, MassDOT and other stakeholders as may be designated. The analysis will be designed to coordinate with the City's Transit Strategic Plan, which is focused on improving transit capacity and quality throughout the City. The CRA, in coordination with the City, will work with Mass DOT and the MBTA to develop the elements of the KSTEP, which can be refined supplemented over time as the Working Group completes it work.

The KSTEP would be supported by immediate and long-term funding commitments facilitated by the CRA and Applicant in connection with the approvals for the Project. It is the expectation of the CRA that consultations with the MBTA, MassDOT, and the City will continue to examine a range of potential transit improvements for Kendall Square to be included in the KSTEP and on the appropriate mechanism(s) for making commitments for these improvements and incorporating the program elements into the transportation planning processes at the City and state level. The CRA recognizes the extensive demands and limited resources available to MassDOT and the MBTA for service improvements throughout the system.

The CRA has developed a Memorandum of Understanding (MOU) with MassDOT and the MBTA, together with Applicant and the City, as a mechanism to identify and implement appropriate transit improvements consistent with the KSTEP. The Draft MOU was filed with MEPA on June 30, 2016.

Over the coming months, the key stakeholders will continue to work closely to refine the MOU, including potential additional details on the process for allocation of funds and the range of transit enhancement projects and program options for consideration. As provided in the MOU, the funding for the KSTEP Fund will be provided through an Initial Payment in the sum of six million dollars (\$6,000,000). The Working Group shall meet to decide on recommendations for initial funding allocations, as set forth in the MOU. Within a year of the Initial Payment to the KSTEP Fund the Working Group shall recommend longer term funding allocations for enhanced transit services in Kendall Square, potentially leveraging additional resources from an expanding KSTEP Fund or from other sources for more significant service enhancements in the future.

Potential transit mitigation projects and program options being considered include:

- **MBTA Red Line Kendall Station Improvements**

Immediate operating and capital improvements to the existing transit infrastructure at Kendall Station, including station capacity and egress, Kendall Square transit information, communications and way-finding, Red Line ticketing, climate change adaptation/resiliency, bus and bicycle connectivity, and overall station functionality and appearance.

- **Kendall Station / Kendall Square Connection Enhancements**
Capital support for improving existing or new ground transportation via non-MBTA shuttles and/or MBTA buses or Bus Rapid Transit (BRT) aimed at facilitating access to and from Kendall Square.
- **MBTA Red Line Service Modernization and Improvements**
Signal, track and other technology improvements designed to increase capacity and reliability especially at peak-of-the-peak including enhancing headways (time between service) and other improvements that will positively impact the quality of transit service and the customer experience.
- **Long-Range Feasibility Investigations**
Planning for and potential capital investment toward new public transit services.

PROPOSED MBTA BUS AND EZRIDE SHUTTLE IMPROVEMENTS

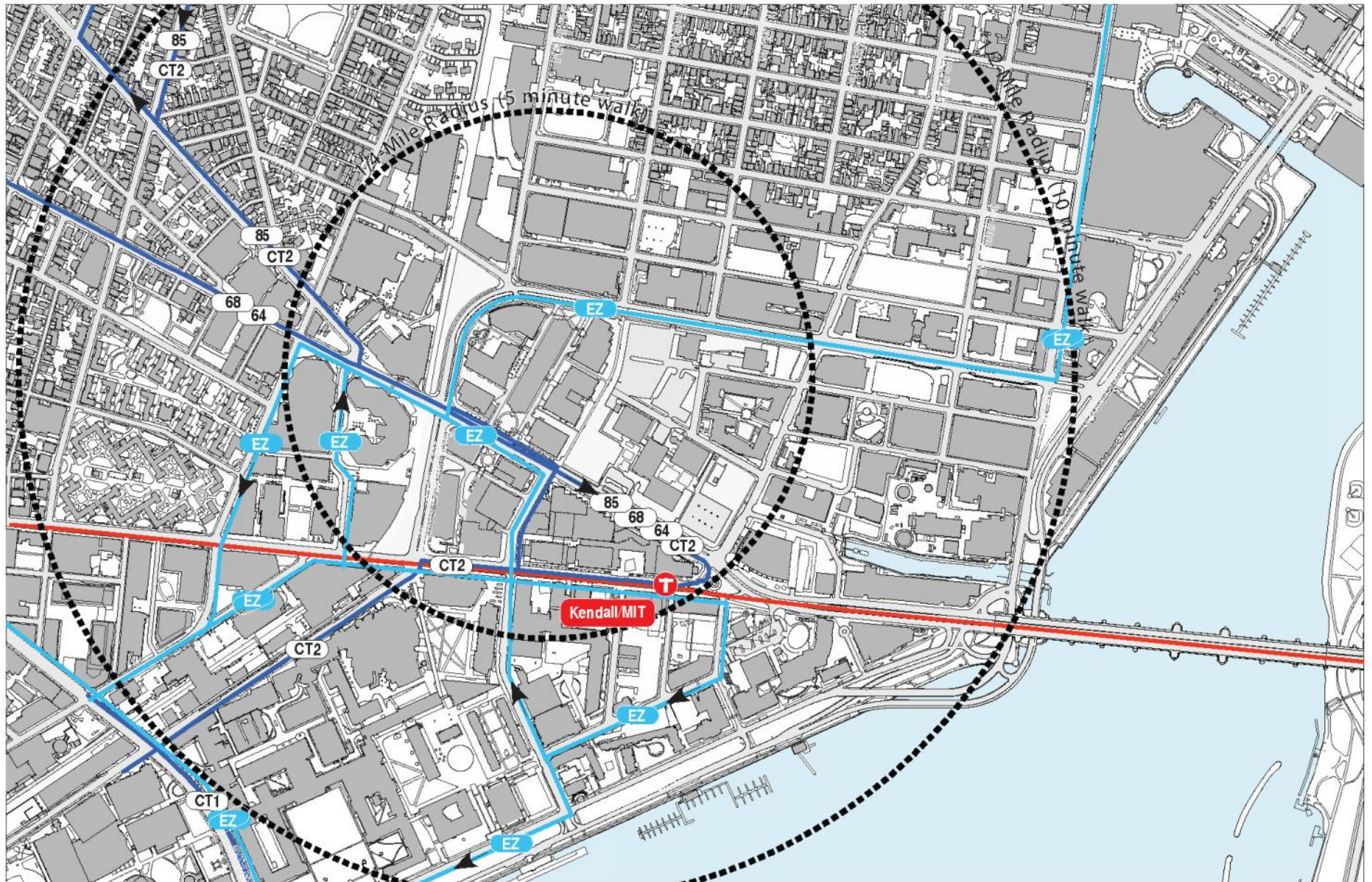
The CRA and Applicant understand the importance of the bus system within the Kendall Square area, including both the MBTA and the EZRide Shuttle systems. As indicated in the TIS analysis, bus operations will be affected by Project-generated traffic, particularly the EZRide Shuttle. The CRA will work with the MBTA, City, and Charles River TMA to evaluate potential bus operations improvements in the KSRP area, including:

- Studying and partially funding the increase in EZRide service. The CRA will work with the Charles River TMA to devise a plan as to how EZRide can best serve the community in the future and provide support to the expansion of EZRide service including, but not limited to:
 - Decreasing headways
 - Increasing bus fleet
 - Optimizing bus routes
- Discussing, with the City, the implementation of the proposed local

roadway intersection signal improvements, discussed and analyzed in the SEIR which will decrease delay at specific intersections that MBTA buses pass through. The bus routes anticipated to experience reductions in delay include Routes 64, 68, 85 and EZRide at the intersections of Broadway at Galileo Galilei Way and Main Street at Galileo Galilei Way/Vassar Street, respectively.

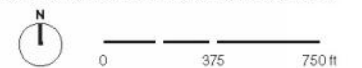
- Discussing with the City, MBTA and MassDOT as part of the MOU process, the study and possible implementation of the following bus mitigation measures along the bus routes serving the area:
 - Bus Priority Signals
 - Bus Lanes
 - Bus Shelter Improvements
- Implementing the extension of bus routes from Central Square to Kendall Square.

The August 25, 2014 draft report, Central Square Access and Circulation Study Existing Conditions Analysis (Task 1), indicates that there is a potential need for a bus connection between Central Square and Kendall Square. Many passengers riding buses that terminate at Central Square use the Red Line to make their last connection to Kendall Square. With the extension of MBTA bus route(s) to Kendall Square demand could be shifted away from the Red Line and a vital second connection would be made between Central Square and Kendall Square. The study was completed and a report compiled July 2015 to address the bus issues within Central Square. While the near-term and longer-term recommendations do not discuss, in-depth, the possibility of extending one or two bus lines to Kendall Square, from the Existing Conditions Analysis Study, this connection is vital. The CRA is interested in exploring and discussing the possibility of providing another Central Square/Kendall Square connection through an MBTA bus route.



- # MBTA Bus Route
- EZ EZ Ride Route
- MBTA Red Line

FIGURE 5.1 - EXISTING PUBLIC TRANSPORTATION



5.3 ACCESS AND CIRCULATION

The proposed development of the Residential Building South will continue to provide vehicle access and egress off Broadway and Binney Street using the existing Blue Garage east and west service roads. As currently planned, implementation of these two buildings will result in the parking supply in the Blue Garage to decrease from 1,170 spaces to 955 spaces (a reduction of 215 parking spaces). These driveways will also provide access to loading and service in the Residential Buildings. Pedestrian access to the Residential Building North will be provided via a main entry along Binney Street. Similarly, pedestrian access to the Residential Building South will be provided along Broadway. Both respective entrances will be located adjacent to and integrated into adjacent mature open spaces located at each end of the Blue Garage. Refer to Figure 5.2 for a vehicular, bicycle and pedestrian access and circulation plan.

The Blue Garage service drives will also serve as public access points to the new parking garages and loading docks that will service Commercial Building A and Commercial Building B. Commercial Building A is intended to have a prominent entrance at the corner of Broadway and Galileo Galilei Way with a significant activation opportunity along Broadway via the implementation of ground floor retail uses. Commercial Building B is anticipated to have a prominent entrance at the corner of Binney Street and the East Alley and ground floor activation along Binney Street an the adjacent 6th Street connector.

TABLE 5-1 REQUIRED BICYCLE PARKING

REQUIRED BICYCLE PARKING SUMMARY					
PROJECT COMPONENT	SIZE	LONG-TERM		SHORT-TERM	
		RATIO	SPACES	RATIO	SPACES
<i>Commercial Building A</i>					
Office/Lab	365,095 GFA	0.30 spaces per 1,000 GFA	110	0.06 spaces per 1,000 GFA	22
Retail	10,037 GFA	0.10 spaces per 1,000 GFA	2	1.00 spaces per 1,000 GFA	11
<i>Residential Building South</i>					
Residential	355 Units	1.05 space per Dwelling Unit ¹	372	0.10 space per Dwelling Unit	36
Retail	0 GFA	0.10 spaces per 1,000 GFA	0	1.00 spaces per 1,000 GFA	0
<i>Commercial Building B</i>					
Office/Lab	248,039 GFA	0.30 spaces per 1,000 GFA	74	0.06 spaces per 1,000 GFA	15
Retail	8,029 GFA	0.10 spaces per 1,000 GFA	1	1.00 spaces per 1,000 GFA	9
<i>Residential Building North</i>					
Residential	70 Units	1.05 space per Dwelling Unit ¹	73	0.10 space per Dwelling Unit	7
Retail	1,300 GFA	0.10 spaces per 1,000 GFA	1	1.00 spaces per 1,000 GFA	2

1. 1.00 space per dwelling unit for the first 20 units in a building; 1.05 spaces per dwelling unit thereafter.

2. All bicycle parking is subject to Section 14.72 of the Zoning Ordinance

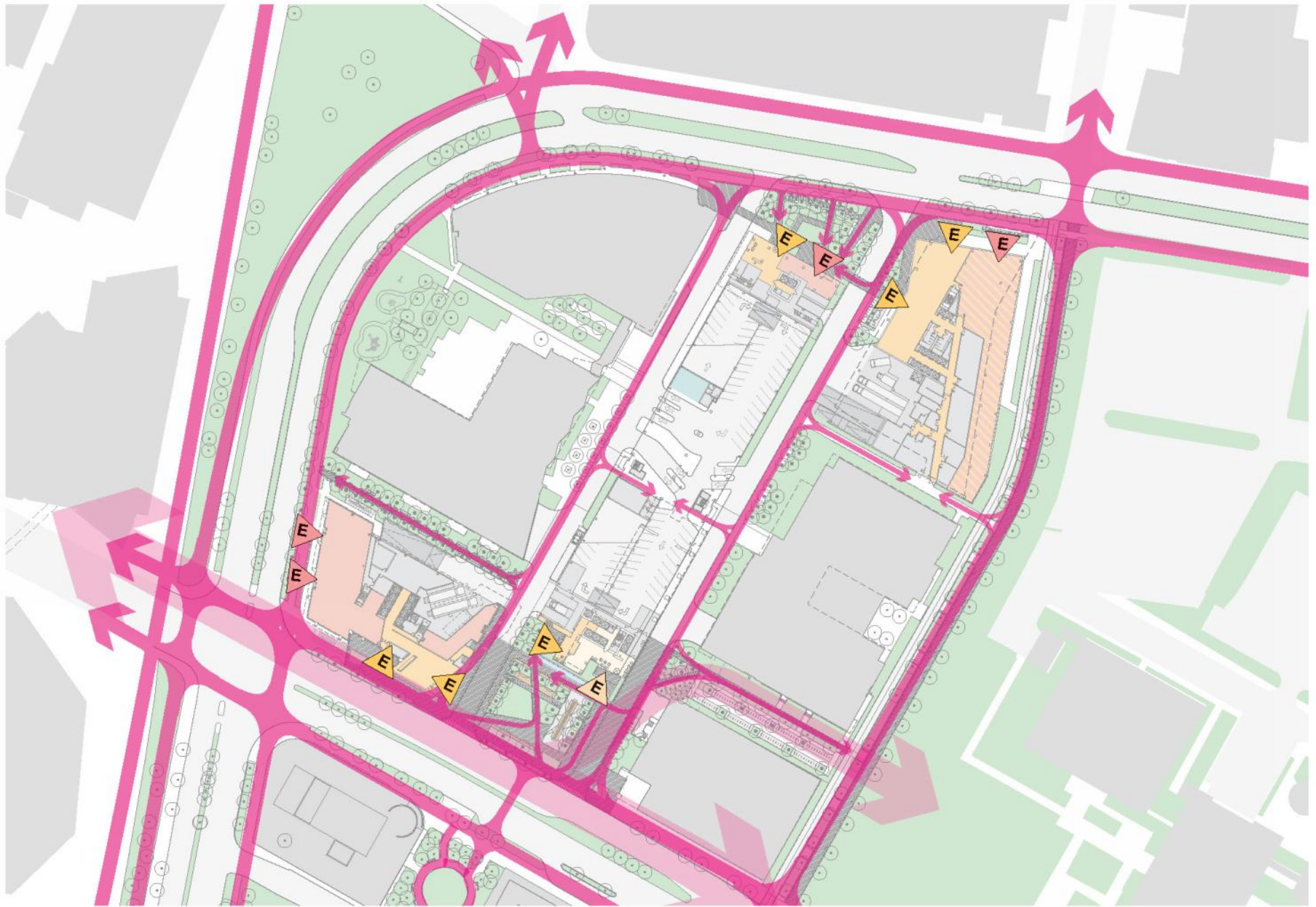


FIGURE 5.2 - VEHICULAR, BICYCLE, PEDESTRIAN ACCESS AND CIRCULATION PLAN



5.3.1 BICYCLE ACCOMODATIONS

The new bicycle parking associated with the Project has been determined by applying the ratios established by the City of Cambridge Bicycle Parking Guide. The ratios and number of bicycle parking spaces being provided by the Project are shown in Table 5-2. Figure 5.3 and Figure 5.4 depicts the bicycle parking plan and layout.

The Project will provide approximately 633 covered and secure long-term bicycle spaces within the vicinity of the Project components. As the individual buildings are still in the design phase, preliminary bicycle parking layouts are provided for each building in Figures 5.a-c. The Project intends to provide a variety of long-term bicycle parking options to accommodate all types of users. For employees looking to ride their bike every day, the convenience of having a bicycle parking spot inside their office building might be very important. These spaces are provided within the below grade parking structures at Commercial Buildings A and B. For less frequent employee riders, spaces will be available within the Blue Garage where a secure shared bicycle area is provided. Residents will also have varying needs and wants for bicycle storage. Residents who use their bicycle daily will have the convenience of storing their bicycle at grade level within the Blue Garage in existing facilities and new areas within close proximity of their particular building. Other residents may want to store their bicycle in a more remote location such as one of the top floors of the parking garage. The variety of long-term bicycle parking options will accommodate a variety of users.

Approximately 102 short-term spaces will be accommodated throughout the site, focusing on the areas near retail and along the 6th Street Connector and various access point off of the pathway. Different options for the locations of the short-term bicycle parking will be discussed with the City to allow for parking spaces to be further from the building entrance points than zoning allows in order to preserve important open space in Broadway Park. All bicycle racks, short- and long-term will be compliant with required standards.

BIKE PARKING LOCATION PLAN

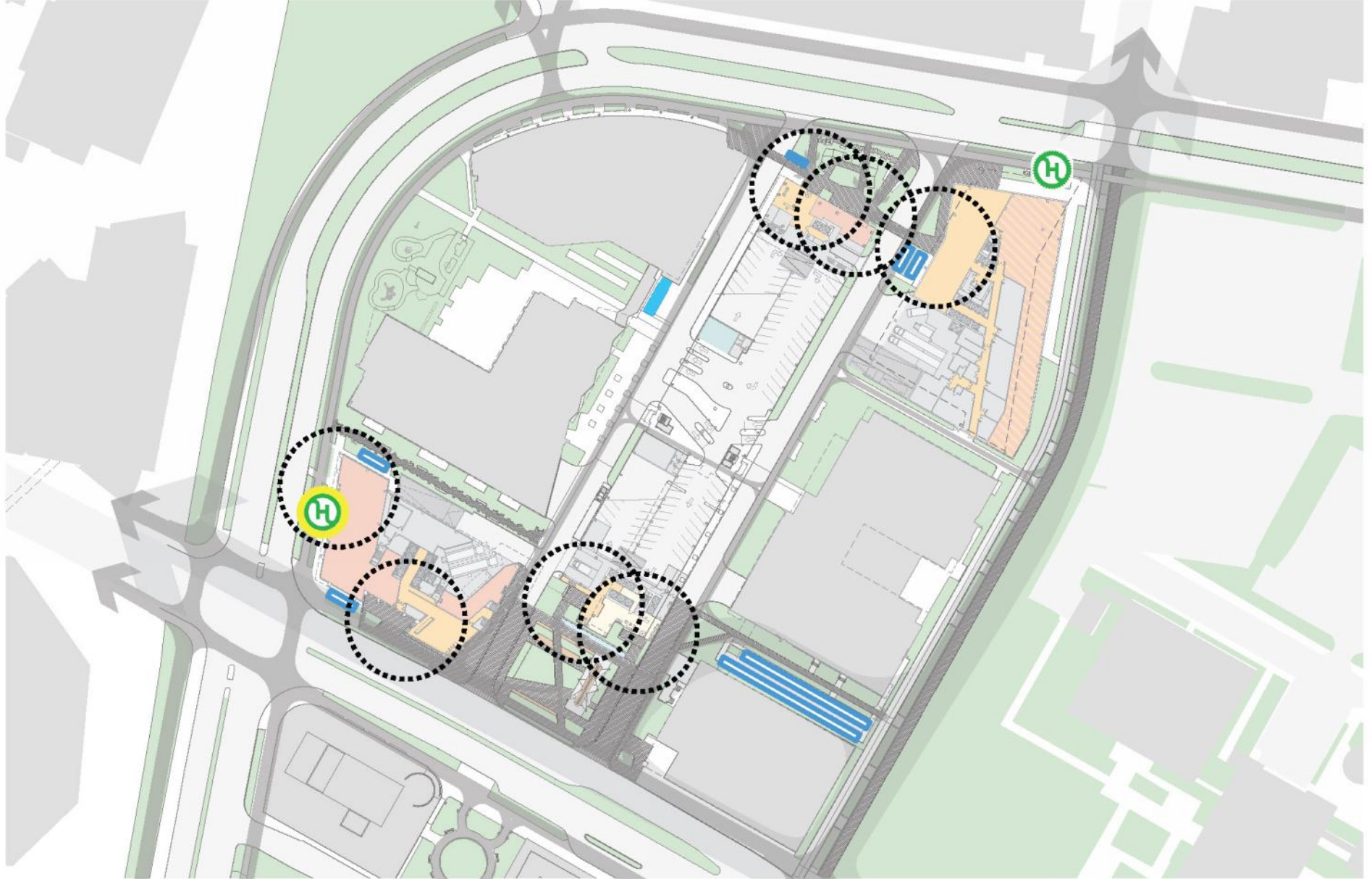


- Existing Short Term Bike Parking
- - - Proposed Short Term Bike Parking
- Existing Long Term Bike Parking
- Proposed Long Term Bike Parking

- Ⓜ Hubway Existing Locations
- Ⓜ Hubway Proposed Potential Locations

FIGURE 5.3 - DISTRICT BIKE PARKING PLAN

BIKE PARKING LAYOUT

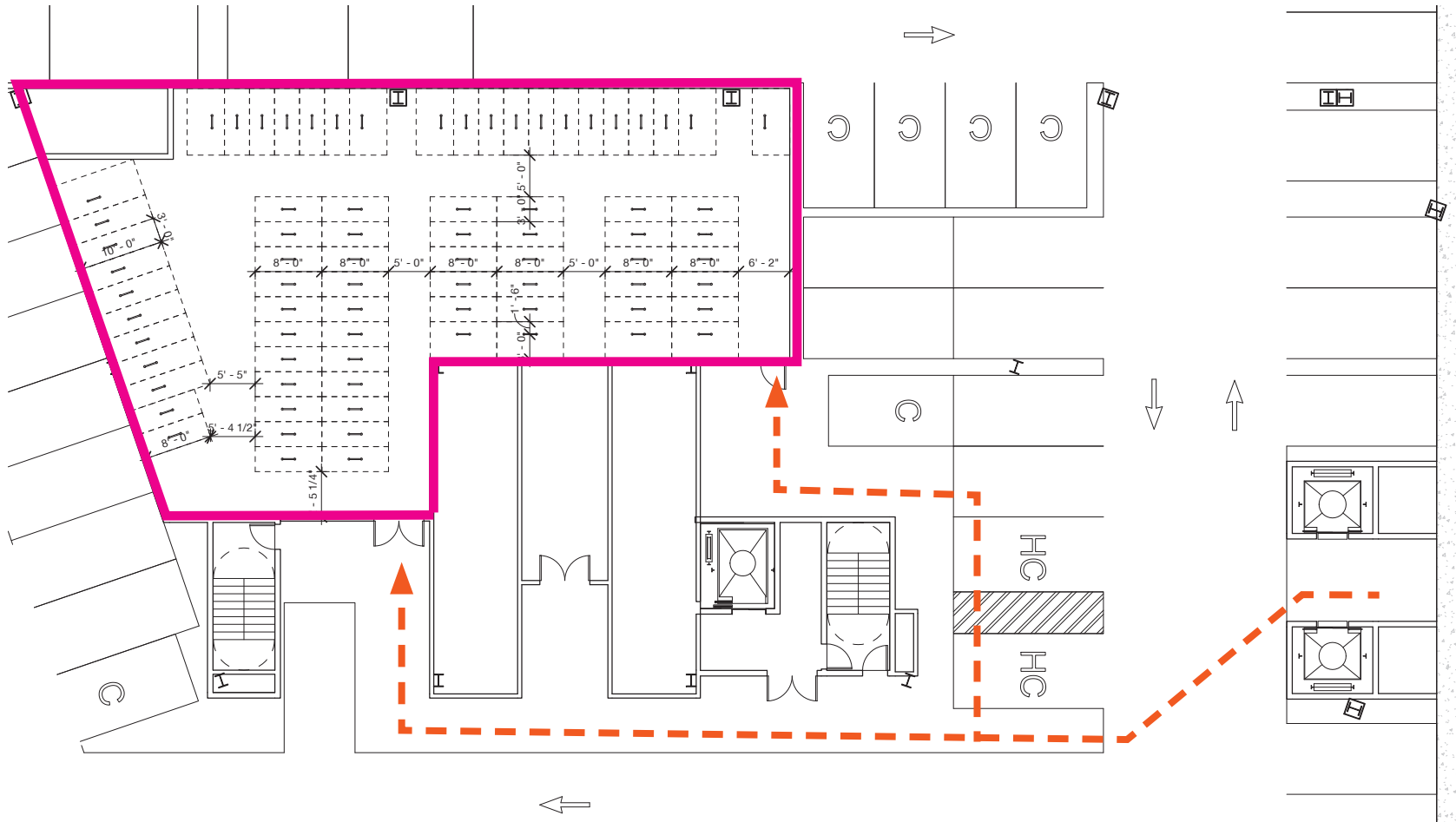
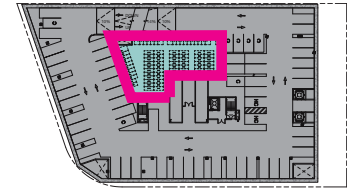


Existing Bike Location
Proposed Bike Location

Hubway Existing Location
Hubway Proposed Potential Location

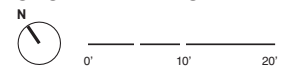
FIGURE 5.4 - BIKE PARKING LOCATIONS

COMMERCIAL BUILDING A- LONG TERM BICYCLE PARKING

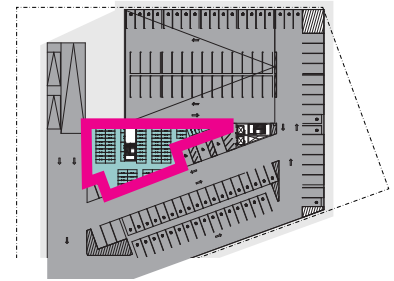


- Long Term Bicycle Parking
- Bicycle Access

ENLARGED LONG TERM BICYCLE PARKING PLAN

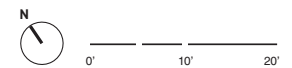


COMMERCIAL BUILDING B - LONG TERM BIKE PARKING

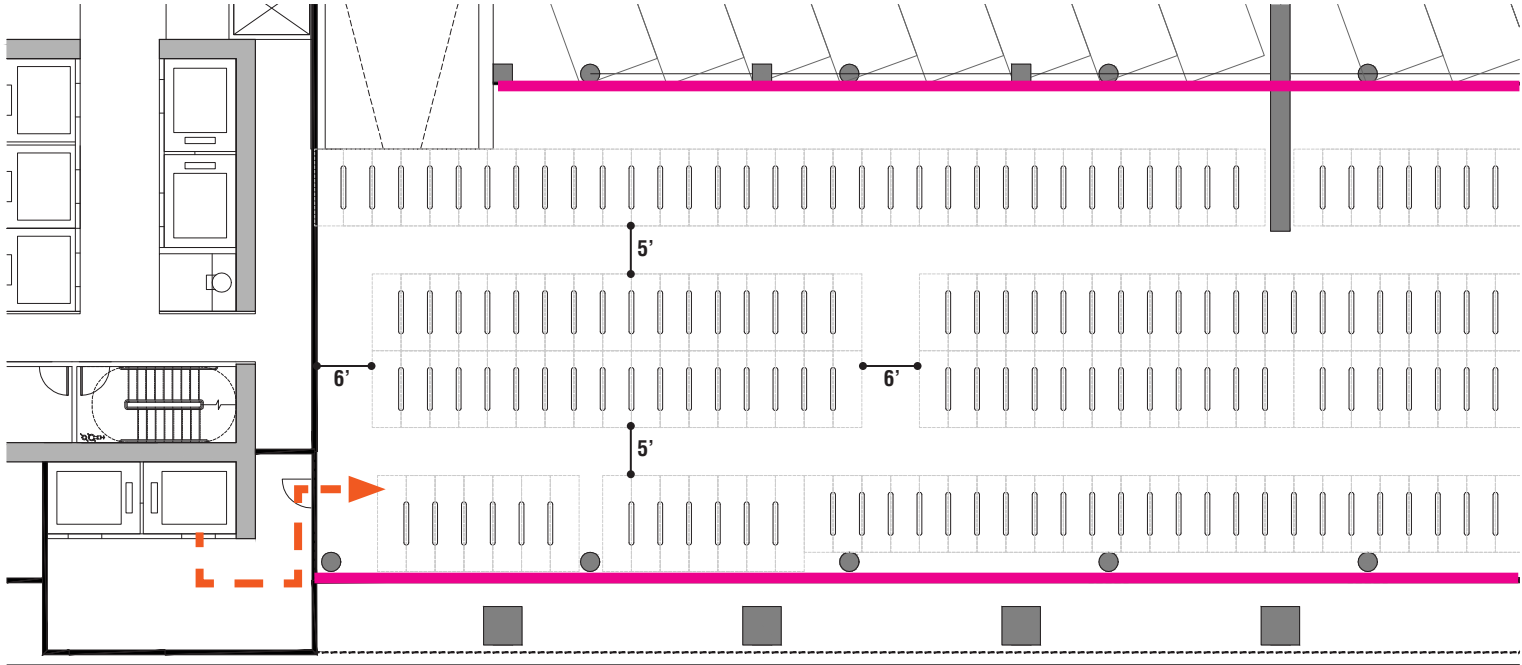


- Long Term Bicycle Parking
- Bicycle Access

ENLARGED LONG TERM BICYCLE PARKING PLAN

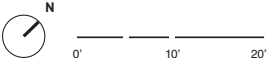


RESIDENTIAL BUILDING SOUTH + NORTH - LONG TERM BIKE PARKING

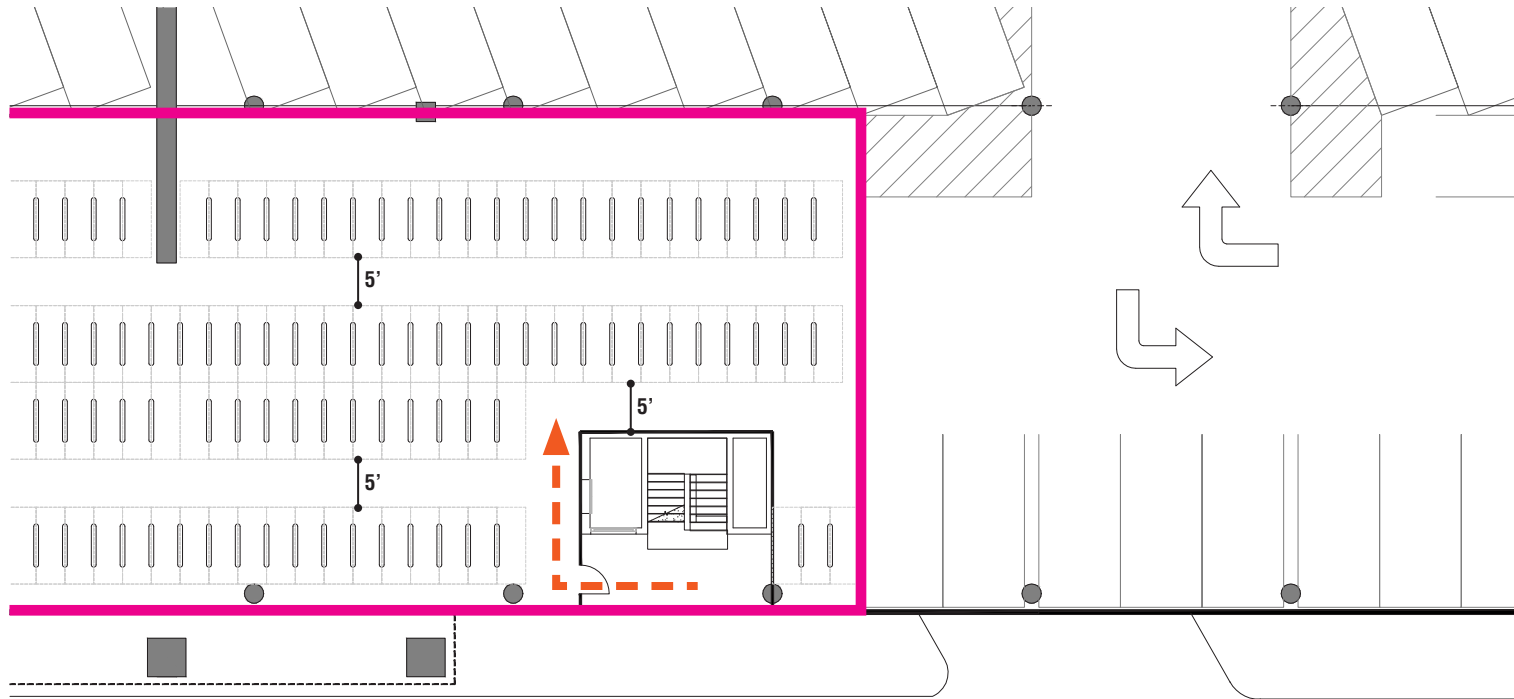


Long Term Bicycle Parking
Bicycle Access

ENLARGED LONG TERM BICYCLE PARKING PLAN

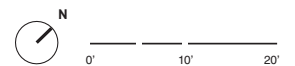


RESIDENTIAL BUILDING SOUTH + NORTH - LONG TERM BIKE PARKING

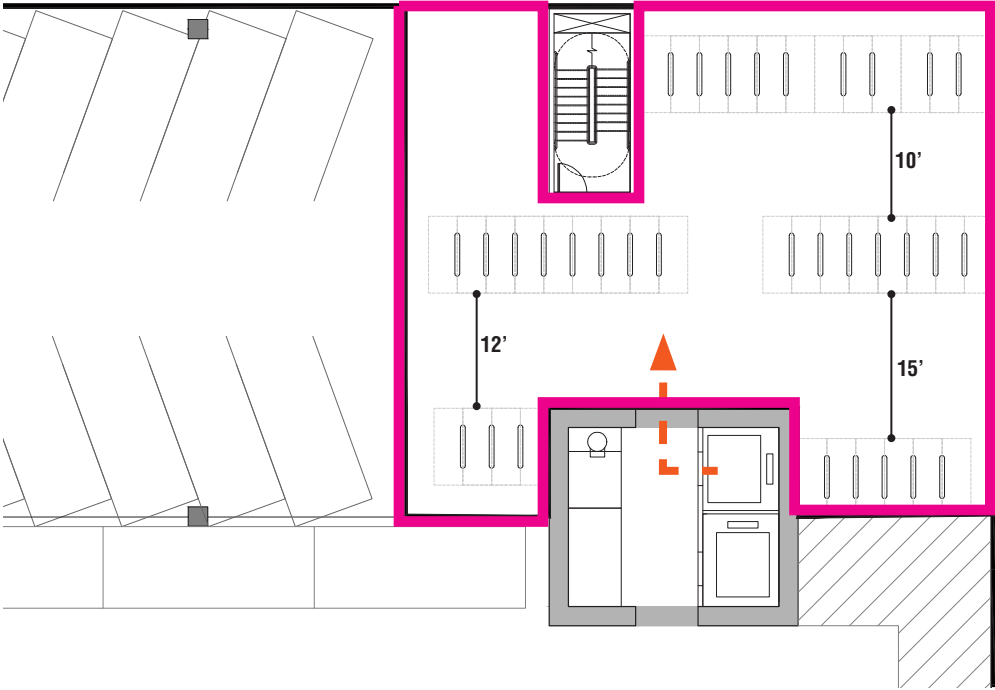


- Long Term Bicycle Parking
- Bicycle Access

ENLARGED LONG TERM BICYCLE PARKING PLAN

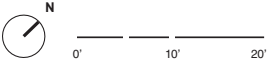


RESIDENTIAL BUILDING SOUTH + NORTH - LONG TERM BIKE PARKING



- Long Term Bicycle Parking
- Bicycle Access

ENLARGED LONG TERM BIKE PARKING PLAN



5.4 TRAFFIC DEMAND MANAGEMENT PLAN

The proposed Traffic Demand Management measures aim to reduce drive-alone trips, or single occupancy vehicles (SOVs), by encouraging employees, residents and visitors to use alternative modes of transportation. The proposed TDM plan for the Project includes consideration of enhanced TDM measures outlined in the K2 Final Report 2013, where applicable and feasible, the commitments made through the SEIR and NPC, as well as Project-specific measures, with the goal of surpassing SOV of 41 percent for office and 32 percent for residential. While current data and survey of KSURP tenants suggest the existing area meets and surpasses the office goal with only 34 percent of employees driving, the new goal will be to maintain this low driving rate as additional office and residential land uses are built in the area. Overall, the goal of the proposed TDM Plan is to reduce the use SOVs by encouraging carpooling and vanpooling, bicycle commuting and walking, and increased use of the Kendall Square public transportation system by employees and residents. The following TDM measures are proposed to be implemented as part of the Project:

- Appropriate pricing of parking – market rate paid by employees and residents.
- Encourage employers and tenants to provide transportation benefits paid to all employees for commuter expenses regardless of mode, or 100 percent transit subsidy.
- Offer new residents an initial or partial transit subsidy (exact terms to be based on City coordination).
- Provide free access to EZRide shuttle to Lechmere and North Station.
- Encourage employers and tenants to provide private employee shuttles.
- Provide adequate bicycle parking and benefits including Hubway availability and possible membership subsidy.
- Maintain ten (10) parking spaces for ZipCar® car share parking currently in the Green Garage and determine the feasibility of implementing or sponsoring additional car-sharing programs.
- Provide designated car-share parking spaces within and/or nearby KSURP parking garages to the car-share business, if deemed feasible.
- Provide preferential parking to carpool and vanpool participants.
- Provide additional electric vehicle (EV) charging stations and preferential parking to alternative fuel vehicles, as dictated by market.
- Designate a Transportation Coordinator to oversee all transportation-related operational matters at each Project Component site, including vehicular operations, servicing and loading, parking and implementation of the TDM Plan. The Transportation Coordinator will act as the contact and liaison for the City, local Transportation Management Association (TMA) and tenants of the Project.
- Post and make available transit maps, schedules and other information relevant to commuting options in the office and residential building lobbies.
- Provide real-time transportation information in all new and “significantly” renovated/improved lobbies within the Project Components using Transit Screen or other similar products including online platforms.
- Display real-time transit information in the public plaza framed by the Marriott Hotel at 50 Broadway, and 255 and 325 Broadway on Parcel 4.
- Continue to participate in the Charles River TMA who’s membership includes, but not limited to:
 - Emergency Ride Home,
 - NuRide – Ridematching system from MassRIDES, and
 - Carpool and vanpool matching.
- Implement shared parking strategies to reduce the number of new parking spaces needed to support the Project.
- Implement new parking pricing strategies to discourage parking in the area and reduce vehicle trips to the area.
- Monitor mode share goals identified as part of the K2 planning process though the proposed Traffic Monitoring Program (described further in the next subsection).

5.4.1 PROPOSED TRAFFIC MONITORING

The CRA has been conducting an annual traffic study and analysis of Kendall Square for the past 20 years, since implementation as compliance with the 1994 Section 61 Findings. The CRA plans to update the scope of the monitoring program to reflect the evolution of Cambridge's transportation priorities in a complex multi-modal urban environment such as Kendall Square. The improved study shall utilize the most up to date development square footage and traffic projections as well as more holistically consider additional data on bicycles, pedestrians, travel behavior and transit service, as it becomes available.

Changes that may be considered in a new scope of work to be developed by the CRA in the near future may include, but are not limited to the following:

- Obtain and utilize basic data on ridership at the MBTA Kendall Square/MIT station for both subway and bus services.
- Include boarding information from EZRide shuttle and other bus services in the area, as data becomes available.
- Update the tenant questionnaire to be more specific on the mode split – differentiating the type of bus (MBTA, EZRide) or new systems, such as Bridge™ and Uber.
- Differentiate between transient and monthly parkers in the garage data collection process.
- Evaluate new bicycle count locations in response to installation of new bicycle facilities.
- Evaluate the annual traffic data collected by other parties and investigate collaborative reporting over a broader geographic scope.
- Utilize emerging pedestrian, bicycle, and traffic counting technologies as they become feasible and fully comparable to existing dataset.

5.5 PARKING

The Project will add up to an additional 809 structured parking spaces to the KSURP area. As currently planned, the two proposed residential buildings will include the elimination of approximately 215 parking spaces within the Blue Garage, to support the construction of those facilities (including adequate lobbies and cores that can intercept the ground plane while maintaining existing adjacent open space). The net elimination of the 215 parking spaces is a direct result of eliminating approximately 246 existing parking spaces due to construction of the two residential buildings and adding approximately 31 spaces on level 6 upon construction of the Residential Building North. Commercial Building A will include up to 374 below grade parking spaces and the Commercial Building B will include up to 650 below grade parking spaces. In total, the Project provides up to 809 new parking spaces to support planned changes in building program.

With the addition of the new Project vehicle parking there will be approximately 3,517 vehicle parking spaces within the KSURP area. Figure 5.6 and Table 5-2 summarizes the existing and future parking supply in the area.

A shared vehicle parking analysis was conducted for the TIS to understand the Project's ability to share new parking spaces and possibly reduce the overall number of spaces built. In addition, the analysis was expanded to include the entire KSURP development to understand the shared parking ability this area has. As indicated above the KSURP currently supplies 2,708 parking spaces in three garages and with the construction of the Project, 809 vehicle spaces will be added to the KSURP Area. This brings the number of total parking spaces to approximately 3,517 spaces. This

new total supply is below the original maximum approved 4,300 vehicle parking spaces under the 1977 FEIR and the revised 3,545 spaces under Amendment No. 3.

The shared parking analysis was conducted using two different methodologies for two different shared parking scenarios. The first methodology follows a similar methodology to the one presented in the KSURP SEIR and updates the existing parking demand with current May 2016 data and follows a holistic parking strategy. The second methodology follows the standard practices suggested by the Urban Land Institutes Shared Parking report, second edition (2015, latest available report), as requested in the Scoping Letter. The two scenarios include a concentration on a shared parking demand based just on the Project, while the second scenario encompasses the entire KSURP development.

Detailed descriptions and tables for these analysis are presented in the TIS, Appendix B. These analyses indicate that the new parking being supplied will provide enough parking to meet demand with the implementation of the TDM strategies. The analysis also indicated that the overall parking demand within the KSURP area will be able to provide enough parking for the area residents, tenants and visitors with the proposed TDM measures and close monitoring of each garage.

Project Component/Garage	Existing Parking	Proposed New Parking for Project	Future Parking
135 Broadway Residences/Blue Garage	1,170	(-215)	955
Yellow Garage	734	0	734
Green Garage	804	0	804
145 Broadway Office Building	0	374	374
250 Binney Street Office Building	0	650	650
Total	2,708	809	3,517

TABLE 5-2 FUTURE PARKING SUPPLY IN THE KSURP AREA

5.4.1 LONG-TERM PARKING MONITORING PROGRAM

All parking facilities are monitored daily to ensure monthly cardholders are parking in the appropriate garages and transient parkers are dispersed efficiently among the three garages. Tenants of the area are provided a limited number of parking passes, as outlined in each individual lease, and are charged the full monthly cardholder price. Other employees or visitors without monthly passes are subject to the daily rates, up to \$40.00 per day.

New tenants of the Project will negotiate the number of parking permits and the specified amount will be within the individual lease. All new monthly parking passes will be charged the full monthly rate. This will encourage more employees to take alternative modes of transportation and reduce the number of monthly parkers parking in the area on a regular basis.

Residential parkers will be provided the opportunity to buy a monthly parking pass at full price. This will encourage a low auto-ownership rate and could further reduce the demand for parking in the area.

A portion of the existing parking demand is from transient users. It is assumed that these users are comprised of employees who do not buy a monthly pass, visitors to area businesses and retail customers. These specific users would therefore be classified as infrequent users of the garage. Under future conditions it is estimated that the parking demand for these users will slightly increase. It will be important to monitor the influx of transient users to the area garages and limit the number of spaces available to these transient parkers. There are many other commuting and parking options within the area including on-street parking and other parking garages in which lots that transient parkers, and retail patrons in particular can utilize. By limiting the number of transient parking available, the garages can operate at an appropriate capacity.

PRICING STRATEGY

Currently the Kendall Center garages have a time-sensitive pricing strategy that discourages driving and parking in the area. A monthly cardholder pays up to \$400.00 per month for a space within the Kendall Center garages and a transient parker pays up to \$40.00 per day. It should be noted that the three garages have some of the highest parking rates in the immediate area with other garages having all-day parking for \$23.00 to \$30.00.

Due to the increasing parking demand within the area, Applicant and other stakeholders are in discussions about implementing new pricing strategies to further discourage vehicle trips to the area. It is the intent of the draft MOU, documented in the KSURP NPC filed on June 30, 2016, to continue to include a proactive parking strategy to discourage vehicle trips to the area as well as help offset other mitigation costs outlined in the MOU.

PARKING FACILITIES



Existing Parking Facilities
 Proposed Parking Facilities

FIGURE 5.6 - EXISTING OFF STREET PARKING

5.7 PROPOSED PEDESTRIAN ACCESS, SAFETY, AND STREETScape IMPROVEMENTS

As discussed previously, the KSURP Area provides excellent pedestrian accommodations, including sidewalks on all study area roadways and crosswalks at all study area intersections. The City is ahead of many other communities in utilizing pedestrian countdown timers with Leading Pedestrian Interval (LPI) programming and many of the signalized intersections within the District have pedestrian countdown timers with such technology.

Both the CRA and Applicant are committed to creating a cohesive integrated network of open spaces and connecting pathways while improving pedestrian safety, access and circulation within the KSURP area. The CRA and Applicant will work in conjunction with the City to identify areas of improvement. Measures could include the following:

- Provide additional pedestrian countdown timers at study area intersections.
- Implement LPI programming at study area intersection.
- Incorporate a new mid-block pedestrian crossing at the Broadway crossing between the proposed Residential Buildings North and South and Danny Lewin Park on the south side of Broadway
- Improve the Sixth Street Connector by increasing driver awareness of the pedestrian crossing with advanced warning signs. In addition, this connection should be studied in connection with the Sixth Street Connector Pathway improvements, possibly improving upon or enhancing the existing HAWK system or other pedestrian crossing systems. The Project proposes to redesign the Sixth Street Connector Pathway to provide separated pedestrian and bicycle facilities while maintaining the mature trees along the existing pathway.
- Review all pedestrian crossings within the KSURP boundaries to assess their potential for sidewalks “bulb-outs”, raised crossings, pedestrian refuge islands, Rectangular Rapid Flashing Beacons (RRFB’s), re-aligned non-apex ramps and/or other treatments to enhance the comfort and visibility of crosswalks.
- Enhance the Main Street streetscape between Ames Street and Galileo Galilei Way.
- Enhance the Broadway streetscape from Ames Street to Galileo Galilei

Way.

- Enhance the Binney Street and Galileo Galilei Way streetscape from Sixth Street to Broadway.
- Improve pedestrian safety by enhancing lighting along sidewalks and pathways for safer pedestrian accommodations.
- Enhance open spaces with multiple outdoor connections to buildings within the KSURP area.

The CRA is currently in the process of selecting a project team to redesign Binney street and Galileo Galilei Way between Third Street and Broadway, including a cycle track along Galileo Galilei Way and the Grand Junction Multi-Use Path. Applicant is also committed to improving the Sixth Street Connector by providing separate bicycle and pedestrian facilities included a grade separated cycle track to be aligned with the future cycle track on Ames Street. Additionally, in close coordination with the City, Applicant, and Other Developers, the CRA will also explore opportunities to create a full-service bike station within the area.

Through the City’s design review and planning board meeting process, the CRA, Applicant and the City will agree upon mitigation for the Project. This process has begun with the certification of the TIS on July 14, 2016 and will continue through review of the Concept Plan and subsequent review of each Project component design.

5.7 SERVICE AND LOADING

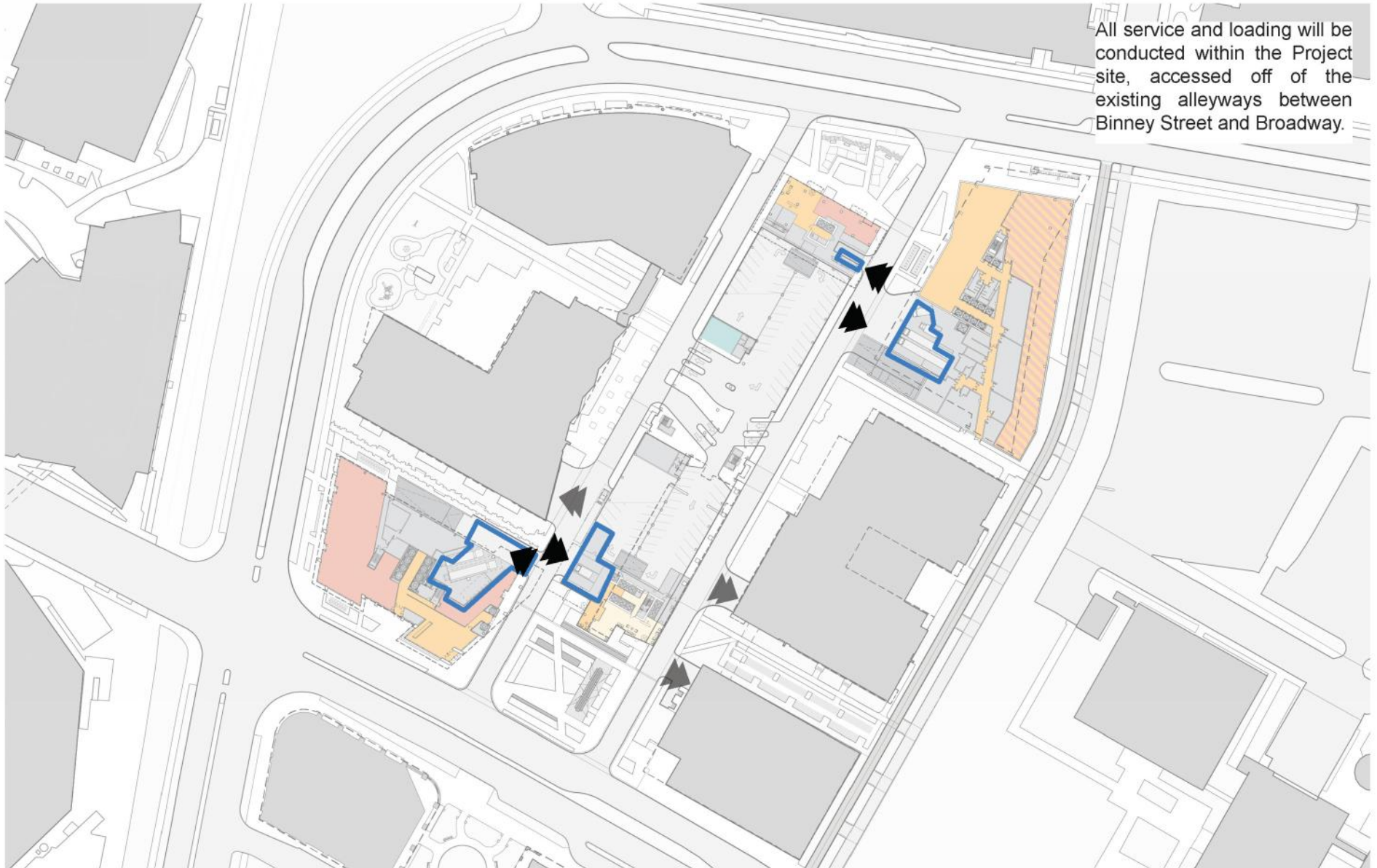
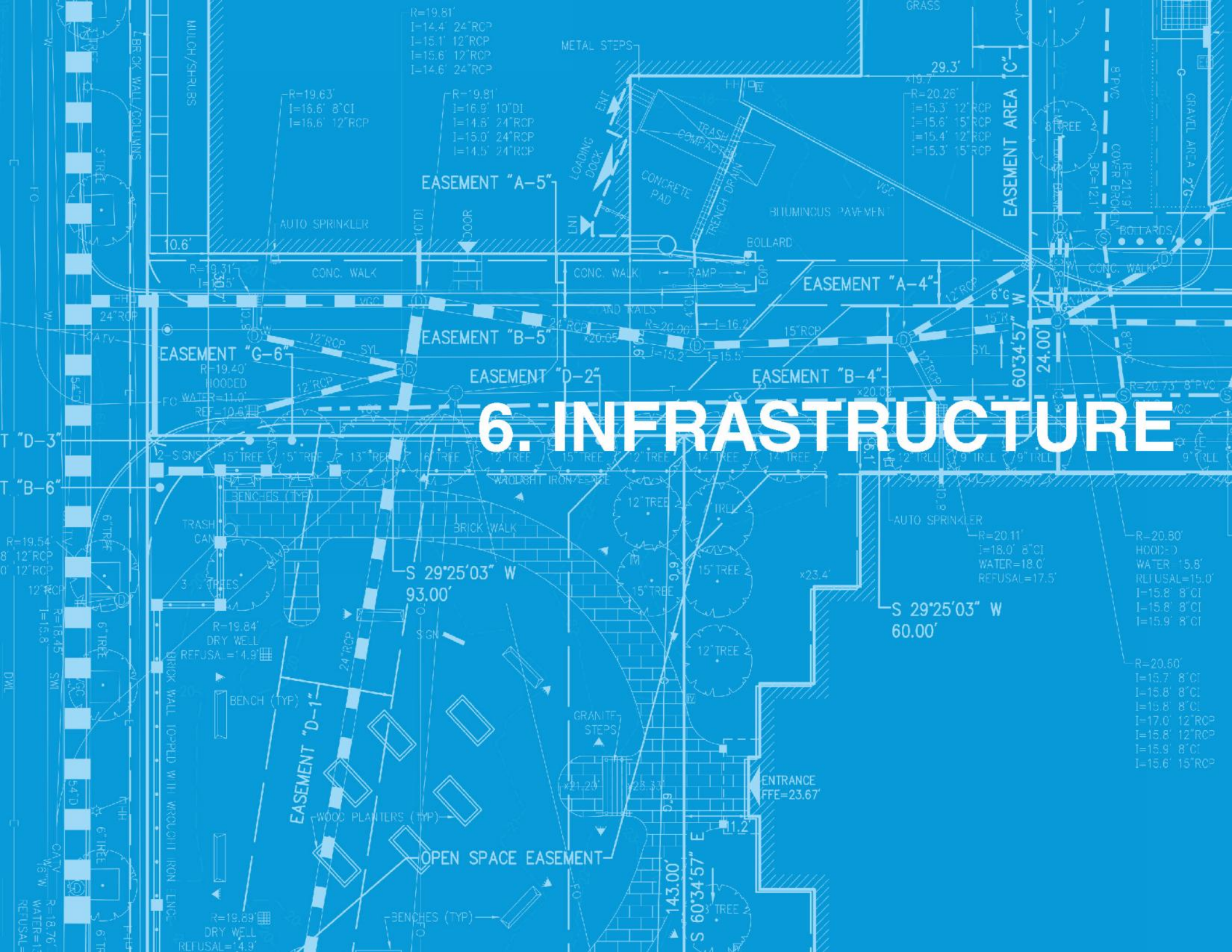


FIGURE 5.7 - PROPOSED SERVICE AND LOADING PLAN

6. INFRASTRUCTURE



6. INTRODUCTION

This chapter details the existing and proposed utility infrastructure that will service the Project. In addition to presenting the existing infrastructure and outlining early discussions with the City of Cambridge, the anticipated utility demands and impact on the local infrastructure is discussed. Early phases of the Concept Plan include investments by the City in the local infrastructure to improve utility capacity for development. The Applicant will implement measures to reduce impacts of the proposed infill development on the existing utility systems. These include employing a district-wide stormwater management approach to reduce the stormwater effluent off-site, mitigating Infiltration and Inflow (I/I) in the sewer system to increase available capacity for new wastewater flows, and applying water conservation measures to reduce demands on the potable water system.

6.1 EXISTING INFRASTRUCTURE

6.1.1 STORMWATER

The existing MXD District is a densely developed, predominantly impervious urban area. The majority of the roadways in the area have separated storm drainage utilities for private and public stormwater runoff conveyance. The Cambridge Department of Public Works (CDPW) owns and maintains the extensive system of catch basins, manholes, and drain pipes. The District's catchment area drains to the Lower Charles River Basin via a 54-inch drain outfall at Broad Canal Way.

The following is a list of existing storm drain services that are located adjacent to each project Component, which are also shown in Table 6-1.

Commercial Building A (145 Broadway):

- A 54-inch main in Broadway
- A 30-inch main in Galileo Galilei Way

Residential Building South (Blue Garage):

- A 54-inch main in Broadway

Commercial Building B (250 Binney Street):

- A 24-inch main in Binney Street
- A 24-inch main in the former 6th Street Connector

Residential Building North (Blue Garage):

- A 24-inch main in Binney Street

The Project will be required to meet the Stormwater Management standards of both the CDPW and the Massachusetts Department of Environmental Protection (DEP). To evaluate the proposed hydrologic conditions, an existing condition model was created in HydroCAD as a baseline for evaluation. Table 6-1 shows the impervious and pervious land covers in the existing condition, as well as the resulting runoff rate and volume for the 2-year design storm.

6.1.2 SANITARY SEWER

The District is serviced by several separated sewer systems, as well as a large combined sewer main, as shown in Figure 6.1. The CDPW owns and maintains the local sanitary sewer system, which discharge to the Massachusetts Water Resources Authority (MWRA) conveyance system to the Deer Island Wastewater Treatment Plant. Wastewater flows from the Project will travel northeasterly by CDPW gravity flow sanitary sewer mains to the MWRA's system located in Cardinal Medeiros Avenue. During dry-weather conditions, the gravity mains in the area have sufficient capacity to support the Project. During wet weather conditions, some capacity issues arise as I/I takes capacity in the system from the wastewater. This will be mitigated through a program to remove I/I relative to the estimated wastewater generation of the Project.

The following is a list of the existing sanitary sewer mains adjacent to each Project Component:

Commercial Building A (145 Broadway):

- A 21-inch main in Broadway
- A 24-inch main in Galileo Galilei Way

Residential Building South (Blue Garage):

- A 21-inch main in Broadway

Commercial Building B (250 Binney Street):

- A 30-inch main in Binney Street
- A 98-inch combined sewer main in Binney Street
- A 8-inch main in the former 6th Street Connector

Residential Building North (Blue Garage):

- A 30-inch main in Binney Street
- A 98-inch combined sewer main in Binney Street
- A 21-inch main in Broadway

Project Component	Existing Site Impervious Area (SF)	Existing Site Pervious Area (SF)	Existing Site Runoff Rate 2-year, 24-hour Design Storm (CFS)	Existing Site Runoff Volume 2-year, 24-hour Design Storm (AF)
Phase 1A - Office Building A	27,707	10,155	2.09	0.164
Phase 2 – Residential Building South	38,630	5,974	2.68	0.217
Phase 2 – Office Building B	51,223	9,398	3.55	0.284
Phase 3 - Residential North	37,406	9,840	2.69	0.213
TOTAL	154,966	35,367	11.01	0.878

TABLE 6-1- EXISTING SITE HYDROLOGY

6.1.3 DOMESTIC WATER

Domestic water and fire protection services in the District provided by infrastructure owned and maintained by the Cambridge Water Department (CWD) are shown in Figure 6.2. There are several transmission and local supply lines throughout the neighborhood to service the various Project components. The local supply system generally has high flow rates, but has water pressure that is typically lower than that required for tall developments. Booster pumps may be required to achieve nominal pressure in the domestic water and fire protection services for each Project component.

The following is a list of the existing water mains adjacent to each Project Component:

Commercial Building A (145 Broadway):

- A 16-inch main in Broadway
- A 30-inch main in Broadway
- A 16-inch main in Galileo Galilei Way

Residential Building South (Blue Garage):

- A 16-inch main in Broadway
- A 30-inch main in Broadway

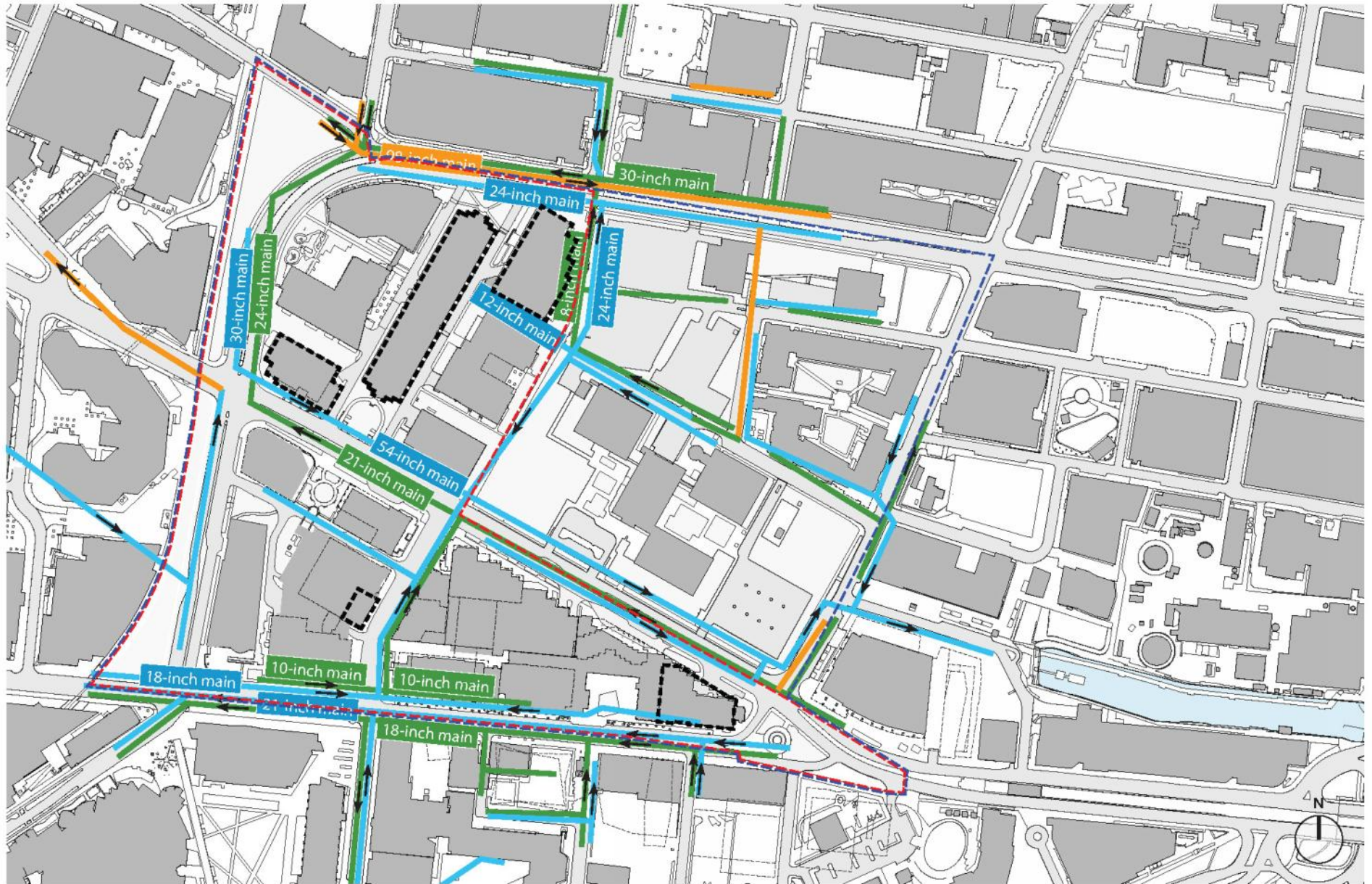
Commercial Building B (250 Binney Street):

- A 16-inch main in Binney Street
- A 12-inch main in Binney Street
- A 12-inch main in the former 6th Street Connector

Residential Building North (Blue Garage):

- A 16-inch main in Binney Street
- A 12-inch main in Binney Street

In addition, there are several water and fire protection services, which serve the existing buildings in the District. Services that are intended to remain active will be protected during the construction phase of this Project. There is also an existing private hydrant that is serviced by a water line running under the Blue Garage. This line will be maintained as part of this Project, and the CDW will be allowed unrestricted access to the line and hydrant at all times.



- Existing Sanitary Sewer System
- Existing Storm Drain
- Existing Combined Sewer
- Project Sites

FIGURE 6-1 EXISTING STORMWATER AND SEWER INFRASTRUCTURE

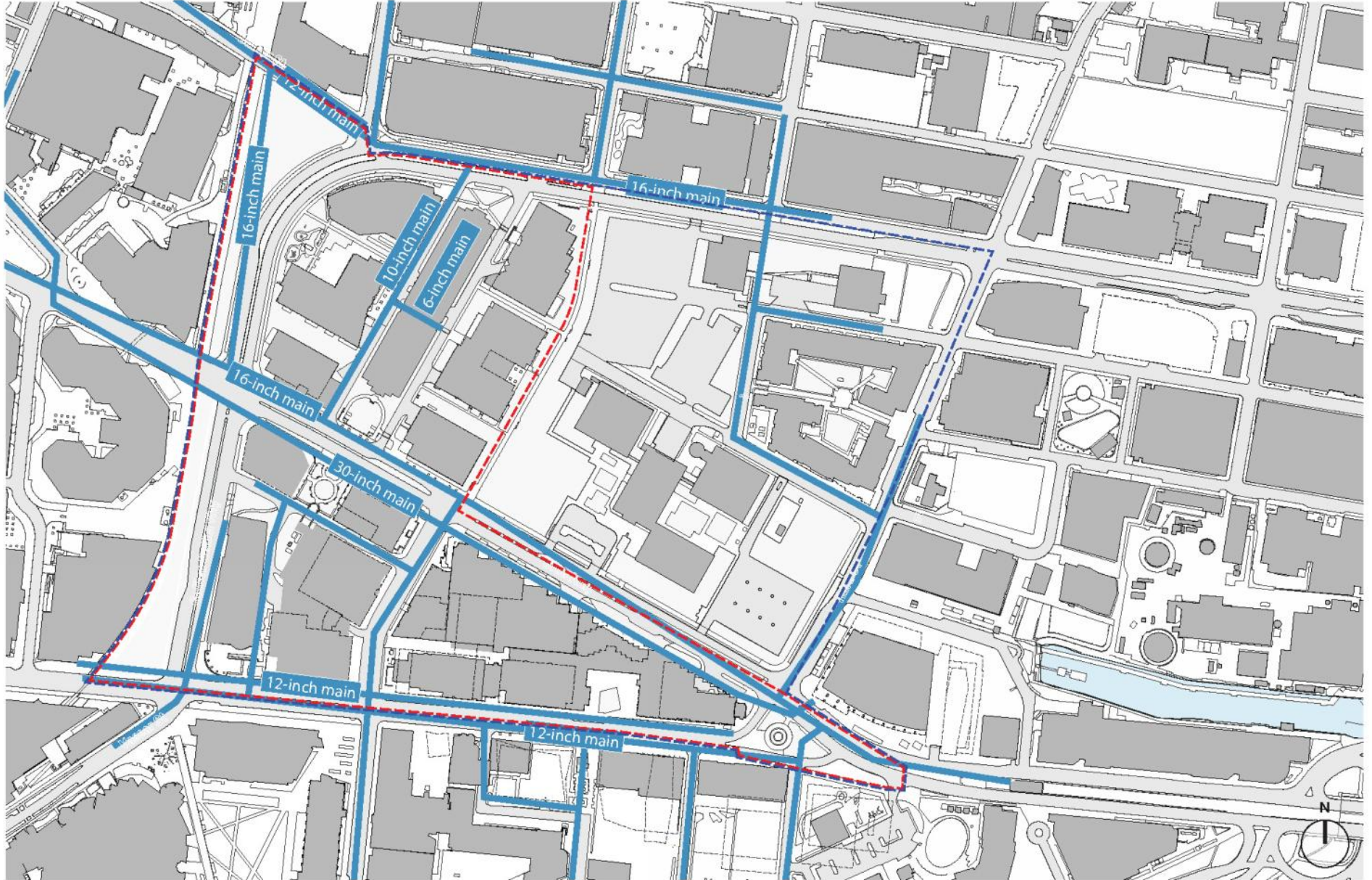


FIGURE 6.2 - EXISTING WATER INFRASTRUCTURE

6.2 PROPOSED INFRASTRUCTURE IMPROVEMENTS

6.2.1 STORMWATER IMPROVEMENTS

In addition to reviewing and approving any new private connections to existing infrastructure, the CDPW reviews and approves the stormwater management strategies of larger developments in the City. CDPW requires that new projects mitigate stormwater such that the peak rate and volume of stormwater runoff in the post-development condition during a 25-year design storm are equal to or lower than that of the pre-development condition for the 2-year design storm. In the existing condition, there are no stormwater management systems implemented throughout the project site that reduce the peak rate or total volume of runoff. Therefore, the Project will greatly improve stormwater contributions to the CDPW stormwater infrastructure by meeting the required mitigation thresholds.

To improve the quality, rate, and volume of runoff from the Project, the Applicant has designed preliminary stormwater management systems, which meet the City's requirements. As an infill project, there is limited opportunity to expand ground level landscaping to improve the hydrologic condition.

Therefore, the Applicant is exploring the use of green roofs to reduce the percentage of impervious cover for the Project. In addition, the Applicant is proposing an integrated stormwater management system for the Project that includes the expansive use of permeable pavements on-site, which overflow to subsurface infiltration chambers. By applying this approach, the Applicant will meet or exceed the required stormwater mitigation standards set forth by the City of Cambridge and DEP. Table 6-2 provides the conceptual stormwater management system proposed for each Project Component. Figure 6.4 provides a graphic display of the integrated stormwater management approach from this Project.

Project Component	Proposed Site Impervious Area (SF)	Proposed Site Pervious Area (SF)¹	Proposed Permeable Paver Area (SF)	Infiltration System Capacity (CF)²	Proposed Site Runoff Rate 25-year, 24-hour Design Storm (CFS)	Proposed Site Runoff Volume 25-year, 24-hour Design Storm (AF)
Phase 1 - Office Building A Net New	27,707	10,155	0	6,178	1.85	0.162
Phase 2 – Residential Building South Total	15,009	29,595	10,443	8,119	2.62	0.168
Phase 2 – Office Building B Net New	33,282	27,339	7,941	9,089	3.44	0.278
Phase 3 - Residential North Total	19,165	28,081	7,762	7,746	2.68	0.213
TOTAL	95,163	95,170	26,146	31,132	10.59	.821

1. Permeable pavements and green roofs included in proposed site pervious area
2. Permeable pavements included in infiltration system capacity, assumes 2-foot deep reservoir course with 30% voids

TABLE 6-2 PROPOSED SITE HYDROLOGY

In addition to mitigating runoff flow rates and volumes, the Applicant is responsible for reducing the Phosphorus loads from the project site to the CDPW stormwater infrastructure to comply with the Lower Charles River Total Phosphorus Total Maximum Daily Load (TMDL) that requires the removal of 80% of Total Phosphorus. Applicant has developed several methods for reducing the Total Phosphorus. These include non-structural methods, increased landscape coverage and green roof installation, enhanced street sweeping program, on-site catch basin cleaning program, and an enhanced organic waste and leaf litter collection program for fall months. These methods can reduce Phosphorus export rates by up to 17% according to Attachment 2 of Appendix F of the Massachusetts Small MS4 General Permit (MS4). These nonstructural, pretreatment Phosphorus treatment strategies will supplement the infiltration based, structural treatment systems. Permeable site pavements and subsurface infiltration structures are the most effective means for removing Phosphorus from the project site, as well as reducing peak rate and total discharge of runoff off-site. Porous pavements are evaluated as infiltration trenches when they do not include an impermeable base liner, which is the current design intent.

The permeable pavements will be designed to treat, at a minimum, 1-inch over the contributing site area, which provides a phosphorus removal rate of 82%. This is conservatively assuming that the soils on the Site are capable of the minimum infiltration rate (0.17 in/hour) evaluated by the MS4 General Permit. All areas that do not drain to the permeable pavements (mostly the building roof areas), will be directed to the subsurface infiltration structures. In order to meet the stormwater peak rate and volume requirements set by the CDPW, these structures are designed to hold and infiltrate over 1-inch of runoff from the contributing area. A 1-inch treatment capacity will reduce phosphorus loads by 92% from the impervious contributing area. The entire Project site area will drain to a structural Phosphorus mitigation measure sized to remove at least 80% of Total Phosphorus and therefore it is expected that the Project will meet the required DEP reduction targets.

6.2.2 SANITARY SEWER

Table 6-3 details the current wastewater generation estimate based on the DEP Sewer Connection and Extension Regulations, 310 CMR 15.203.f by building use with the latest KSURP building program. The Project is estimated to generate 134,973 GPD of net new wastewater relative to the existing condition. As required by the CDPW, each Project component will have a sanitary holding tank capable of retaining the 8-hour peak sanitary flow from the building with a 1.5 factor of safety. Although the volume of each sanitary holding tank will be coordinated with the CDPW, the initial estimated size is conservatively assumed to equate to the full estimated daily flow. In addition, all drainage from enclosed vehicular parking and loading will be treated with an MWRA approved gas/oil separator. If a portion of Project's program includes restaurant use, then a grease trap will be installed to pretreat wastewater effluent, thereby minimizing the potential impact to the CDPW sanitary sewer system.

The City of Cambridge is required to remove I/I from its sanitary sewer system by the MADEP in an effort to reduce and eliminate the potential for Combined Sewer Overflows (CSOs) to Massachusetts waterways. The CDPW is responsible for coordinating I/I removal for developments in Cambridge that generate greater than 15,000 GPD of wastewater, at a ratio of 4 gallons of I/I per GPD of wastewater. As such, the Applicant will coordinate an I/I removal plan with the CDPW before the individual buildings are occupied. Table 6-4 shows the estimated I/I removal for each project Component based on the estimated wastewater generation, which totals 497,472 gallons.

Figures 6.3A and 6.3B provide graphic displays of the water/sewer improvement plan for this Project.



- Green Spaces
- Permeable Pavement
- ▨ Green Roofs
- Infiltration System

FIG 6.3A DISTRICT-WIDE STORMWATER MANAGEMENT PLAN

0 100 200ft

Project Component ¹	Use	Quantity	Flow Rate (gpd)	Sewage Generation (gpd)
New Project-Related Sewage Generation				
Phase 1 – Commercial Building A	Office	443,731	75/1,000 sf	33,280
	Restaurant	134*	50/seat	6,700
<i>Comm. Building A Total</i>				<i>39,980</i>
Phase 2 – Residential Building South	Residential	533**	110/bdrm	58,630
<i>Residential South Total</i>				<i>58,630</i>
Phase 2 – Commercial Building B	Office	310,615	75/1,000 sf	23,296
	Retail	8,029	50/1,000 sf	402
<i>Comm. Building B Total</i>				<i>23,698</i>
Phase 3 – Residential Building North	Residential	105**	110/bdrm	11,550
	Retail	1,300	50/1,000 sf	65
<i>Residential North Total</i>				<i>11,615</i>
Broad Institute Office Conversion	Office	14,000	75/1,000 sf	1,050
<i>Broad Institute Total</i>				<i>1,050</i>
Total New Project-Related Sewage Generation				134,973
Existing Sewage Generation to be Removed				
Eleven Cambridge Center	Commercial	78,636	(75/1,000sf)	(5,898)
Fourteen Cambridge Center	Commercial	62,576	(75/1,000sf)	(4,707)
Total Existing to be Removed				(10,605)
Net New Wastewater Generation				124,368

TABLE 6-3 ESTIMATED WASTEWATER GENERATION FOR THE CURRENT PROJECT

Project Component ¹	Net New Wastewater Generation (gpd)	I/I Removal Requirement (gallons)
Phase 1 - Commercial Building A Net New	34,082	136,328
Phase 2 – Residential Bldg. South Total	58,630	234,520
Phase 2 – Commercial Building B Net New	18,991	75,964
Broad Institute Office Conversion	1,050	4,200
Phase 3 - Residential Bldg. North Total	11,615	46,460
Total I/I Removal	124,368	497,472

1. I/I removal is not required for the Innovation Space Conversion because it will generate the same amount of wastewater as the existing office space.

TABLE 6-4 CURRENT PROJECT I/I REMOVAL BY PROJECT COMPONENT^{TT}

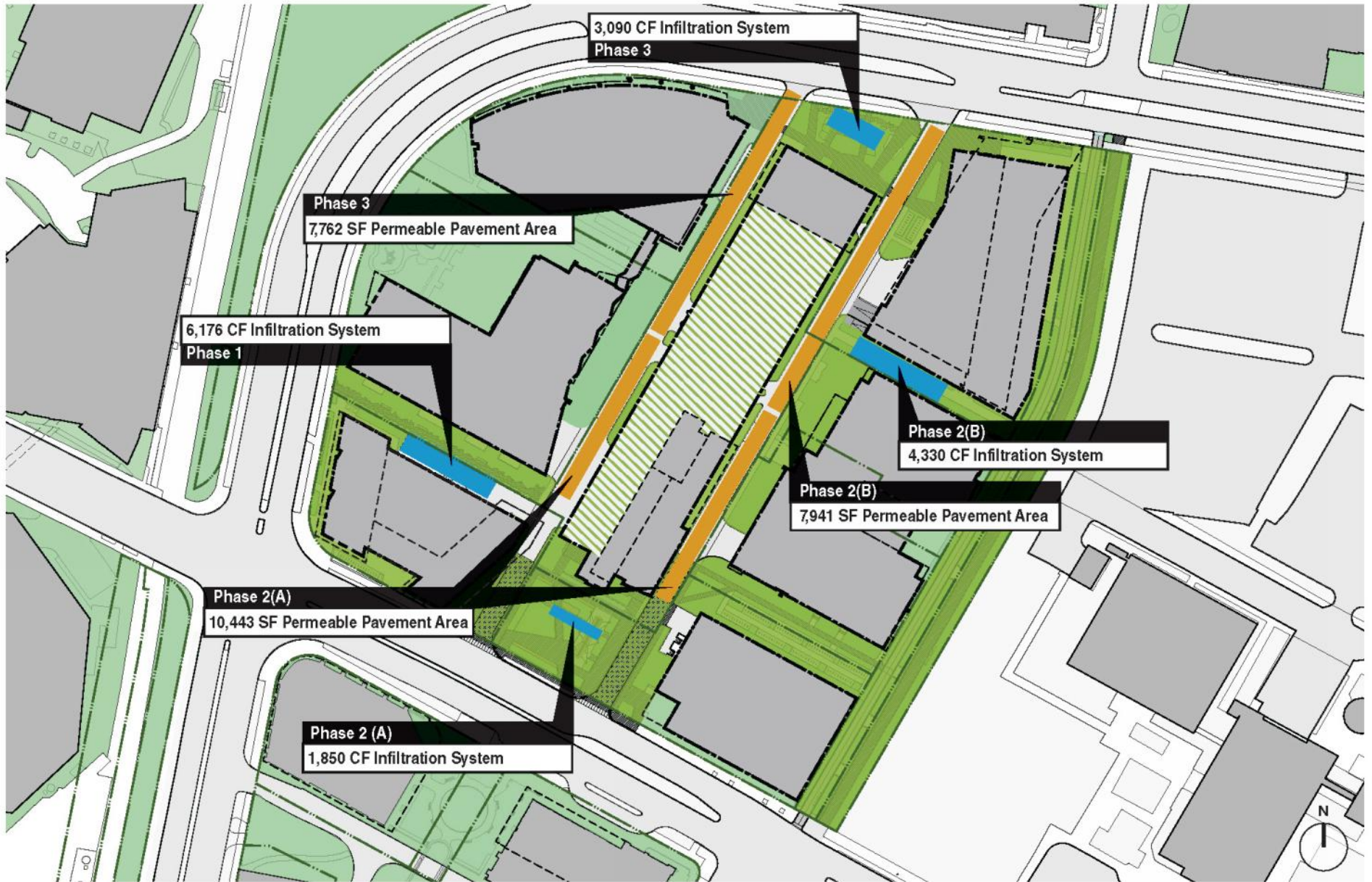
gpd = gallons per day

bdrm = bedroom

*assumes 10,037 SF and 50 SF/seat

**assumes 1.5 bedrooms per unit

1. The Innovation Space Conversion component is not included because it will generate the same amount of wastewater as the existing office space.



- Green Spaces
- Green Roofs
- Permeable Pavement
- Infiltration System

FIG 6.3 B STORMWATER MANAGEMENT PLAN

0 50 100 ft

6.2.3 DOMESTIC WATER

During the MEPA review process, the CWD provided initial confirmation that the local water infrastructure should have sufficient capacity to serve the Project. The water demand for each Project component is initially estimated by applying a 10% consumption factor to the wastewater generation estimate. Therefore, the estimated Project water demand over the existing condition is equal to 136,805 GPD. The estimate for each Project Component is show in Table 6-5. As discussed in Section 8, Sustainability, to meet the Project's sustainability goals, water conservation measures will be implemented for each Project Component to greatly reduce the water demand. Preliminary discussions with the CWD during the MEPA review process did not elucidate any capacity issues in the District to serve the Project for both domestic water and fire protection services. BP will evaluate the need for domestic and fire protection booster pumps to compensate for any deficiencies in the water pressure in the water mains adjacent to each Project component. Hydrant flow tests conducted in the field will be used to make this evaluation. Where possible, redundant domestic water and fire protection services will be connected to a separate supply main, otherwise isolation valves will be installed to ensure that domestic water and fire protection services are not interrupted by isolated service issues. All existing domestic water and fire protection service lines that require removal will be cut and capped at the main, as required by the CWD.

Figures 6.3A and 6.3B provide graphic displays of the water/sewer improvement plan for this Project.

Project Component¹	Water Demand (GPD)
Phase 1 - Office Building A Net New	37,490
Phase 2 – Residential Bldg. South Total	64,493
Phase 2 – Office Building B Net New	20,890
Broad Institute Office Conversion	1,155
Phase 3 - Residential North Total	12,777
Total Water Demand	136,805

1. The Innovation Space Conversion component is not included because it will have the same potable water demand as the existing office space

TABLE 6-5 ESTIMATED WATER DEMAND BY PROJECT COMPONENT

6.3 VULNERABILITY ASSESSMENT

The Applicant has coordinated with the City of Cambridge to identify the capacity issues in the stormwater infrastructure serving the District. Applicant is particularly concerned with the potential for inland flooding due to stormwater system surcharges, especially in context with the expected changes in precipitation patterns and sea level rise and storm surge. Applicant has coordinated with the City to determine the appropriate building finish floor elevations in the District to reduce the risk of the Project being impacted by flooding. For Commercial Building A and Residential Building South, the 100-year flooding event projected for the year 2030 is anticipated to be El. 19.34 Cambridge City Base (CCB). For the year 2070, the 100-year flooding event projection is El. 20.10 CCB. For Commercial Building B the Residential Building North, the 2030 and 2070 100-year flood event projections are El. 20.73 CCB and El. 20.93 CCB, respectively.

The CDPW recommends that building finish floor elevations be designed to the 2030 flooding event projections, while being designed to recover from the 2070 flooding elevations. The ability to recover was defined as locating critical infrastructure susceptible to flood damage above the 2070 elevation. These elevations do not take into consideration a precipitation event occurring concurrently with a storm surge event. For the 10-year storm with the impacts of climate change in 2070, minor flooding is expected in Broadway at Galileo Galilei Way, and stormwater infrastructure will have limited capacity for increased flows. The flooding will be greatly exacerbated during a concurrent storm surge event propagating through the stormwater system. At the time of this filing, the City has not finished evaluating the concurrent flooding and storm surge event.

Applicant intends to design all Project components to meet or exceed the recommended planning flood elevations. Figure 6.4 shows the recommended design flood elevations for the 2030 and 2070 design events as they relate to the existing topography. To account for the probability of a concurrent precipitation event with storm surge propagation in stormwater infrastructure, Applicant will study additional resiliency measures. These measures may include oversized stormwater conveyance infrastructure, backflow preventers on effluent stormwater pipes, watertight internal gravity piping to the second floor, and the district wide stormwater management strategy, which greatly reduce the rate and volume of site stormwater effluent providing capacity for runoff from the remaining catchment area.

As flooding is expected to worsen over time, the Applicant will continuously review the latest design recommendations and literature to determine if/when portable flood protection systems, such as Portadam or the Aquafence Flood Barrier System, should be implemented on-site to increase the Project's resiliency. Similarly, the sanitary sewer system is expected to experience greater capacity issues from I/I with changes in precipitation patterns. To mitigate risk from sanitary sewer surcharge, backflow preventers will be installed on building sewer laterals, internal gravity piping will be watertight to the second floor, offline sanitary holding tanks will hold building wastewater during surcharge conditions, and the Project will address I/I as outlined in Section 6.2.2.

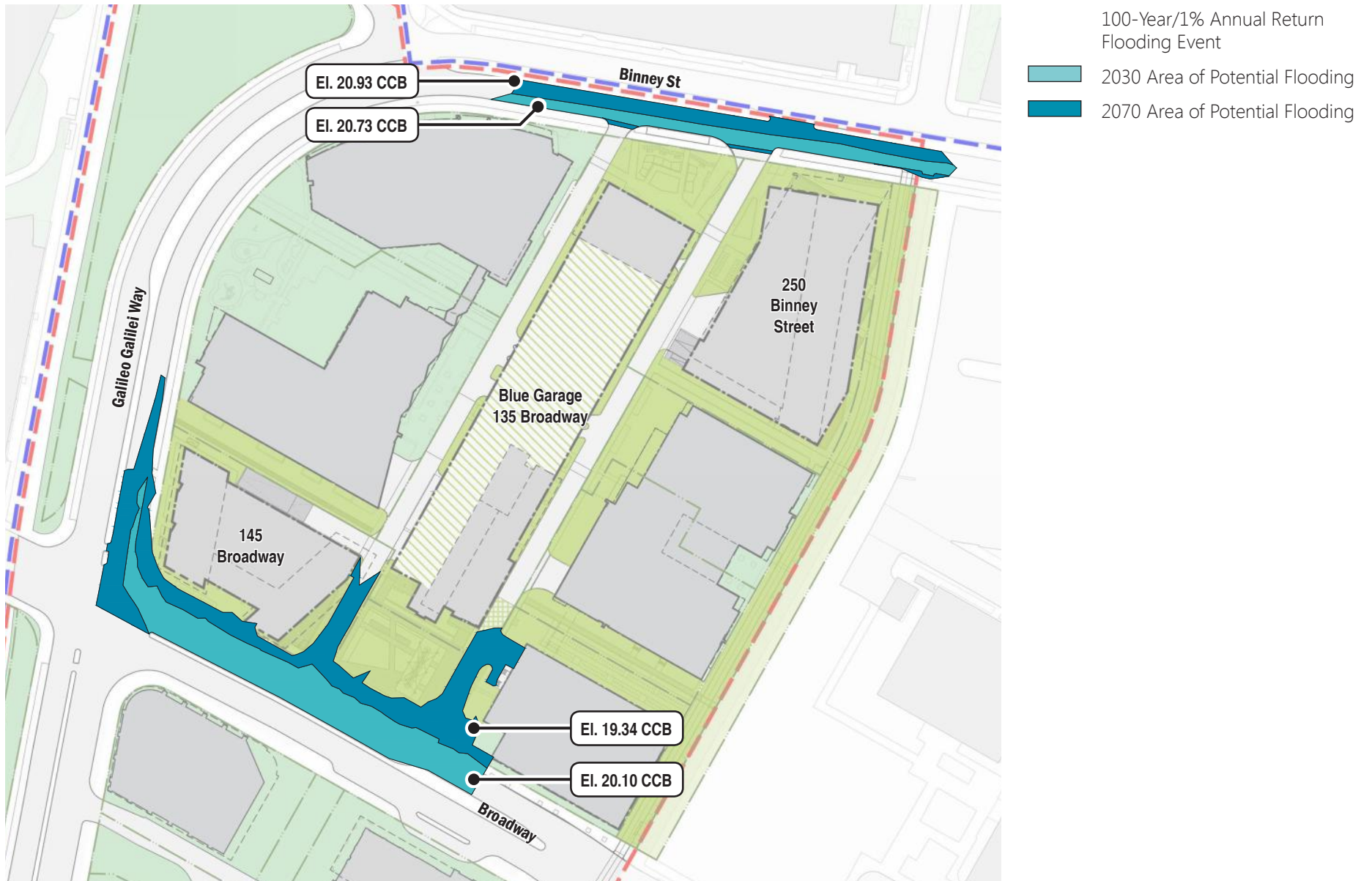


FIGURE 6.4 FLOODING FROM 100-YEAR STORM SURGE EVENT PROPAGATION THROUGH DRAINAGE SYSTEM

