Expanded Notice of Project Change
EEA No. 1891

Kendall Square Urban Renewal Project (KSURP) Amendment No. 10

Cambridge, Massachusetts

SUBMITTED TO Executive Office of Energy and Environmental Affairs
Massachusetts Enviromental Policy Act Office

PROPONENT Cambridge Redevelopment Authority

PREPARED BY vhb

IN ASSOCIATION WITH:

Boston Properties
Sasaki Associates
Foley and Hoag
AHA Consulting Engineers
Haley & Aldrich

April 2015

April 15, 2015

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Attention: Deidre Buckley, Director of the MEPA Office
100 Cambridge Street, 9th Floor
Boston, MA 02114

Re: **Expanded Notice of Project Change**
Kendall Square Urban Renewal Project (KSURP) Amendment No. 10 Cambridge, MA
EEA No.1891

Dear Secretary Beaton and Director Buckley:

On behalf of the Cambridge Redevelopment Authority (the "Proponent") and Boston Properties (the "Redeveloper"), Vanasse Hangen Brustlin, Inc. (VHB) is pleased to submit the enclosed "expanded" Notice of Project Change (NPC) for Plan Amendment No. 10 to the Kendall Square Urban Renewal Plan (KSURP) to allow for additional commercial and residential development within the Kendall Square neighborhood of the City of Cambridge (the "Project Change" or "Project").

The approximately 43-acre KSURP area has been undergoing redevelopment since 1965 when the KSURP was originally approved. In 1977, the KSURP was amended to create a Mixed Use District (MXD) that has since been transformed into Cambridge Center—a major urban mixed-use project reviewed by MEPA at that time. The Redeveloper was selected by the Proponent in 1979 to take on the Cambridge Center project and most of the property is now owned and managed by the Redeveloper. The Project Change consists of new commercial office/innovation space development over the Cambridge Center North Garage, a new residential building at Eleven Cambridge Center, and a new mixed-use building at Three Cambridge Center. Additionally, the Project Change includes an approximately 60,000-square foot commercial office/lab expansion of the existing Whitehead Institute building at Nine Cambridge Center and the conversion of approximately 15,100 square feet of mechanical space into commercial office space at the Broad Institute at 75 Ames Street. These latter components of the KSURP expansion will be undertaken by other parities in coordination with the Proponent separate from the Redeveloper.

In 2013, the Community Development Department of the City completed the K2 Planning Study after an extensive 3-year public planning process. The proposed Amendment No. 10 will advance the City's planning goals and recommendations for the KSURP area as stated in the K2 Planning Study, to increase the utilization of the existing urban infrastructure and leverage the hub of innovation in Kendall Square to create a more dynamic mixed-use environment. The KSURP will be updated to not only facilitate job growth and expand housing opportunities in Kendall Square, but to implement the broader goal of

creating a sustainable, inviting and inclusive neighborhood.

Since the original MEPA approval of the first amendment to the KSURP in 1977, the Proponent has regularly consulted with and updated the MEPA office on Plan Amendments. With each submission, the Proponent included a complete and updated analysis of project impacts, with a particular focus on analyzing the impact of changes on projected traffic impacts in the MXD District of the KSURP area. This reporting has consistently shown that actual trip generation in Kendall Square is significantly lower than would be projected utilizing accepted, standardized methodology for average daily vehicle trip (ADVT) projections. Based upon this extensive record of updated analysis of the traffic impacts from the KSURP, including annual trip and parking counts completed by the Proponent over a 20 year period, a better forecast of vehicular and transit trips associated with the Project Change (utilizing an approach developed based on guidance from the City and, subsequently, approved by Massachusetts Department of Transportation) can be provided.

Throughout the development of Cambridge Center, the Proponent and the Redeveloper have remained focused on enhancing the favorable transportation mode split in Kendall Square that has played such an important role in the successful redevelopment of the area. It is acknowledged and well documented that an estimated 70 percent of trips travelled to Kendall Square utilize transit, walking, biking, shuttle and/or carpooling. This remarkable factor is at the core of the opportunity for the Project. The importance of maintaining and improving this mode split cannot be overstated, and is central to the Proponent's plans for expansion of the KSURP.

Plan Amendment No. 10 will be subject to review and consideration of the Cambridge City Council, which the Proponent anticipates will occur later this year, before approval by the Department of Housing and Community Development. The Project Change facilitating the development up to 1,034,000 square feet of net new development in the KSURP area incorporates measures to avoid, minimize or mitigate all areas of potential environmental impact (i.e., local roadway improvements, stormwater management facilities). No new MEPA review thresholds or Mandatory Environmental Impact Report (EIR) review thresholds are triggered as a result of the Project, with the exception of Transportation-related thresholds (new **unadjusted** projected daily traffic and new parking spaces). The technical analyses enclosed as part of the "expanded" NPC demonstrate that the Project Change does not result in any new significant environmental impacts (that have not been or are not addressed with mitigation) beyond those documented and analyzed in the most recently previously reviewed MEPA filing. The Proponent requests a finding that the Project Change as proposed incorporates appropriate measures that adequately address environmental impacts such that a Single Environmental Impact Report to respond to comments on the Project Change is required.

We look forward to working with you and your staff, other state agencies as well as members of the community to develop the best redevelopment plan for this location. We anticipate that the NPC will be noticed in the next Environmental Monitor. Requests for copies of the NPC should be directed to me at 617-607-0091 or via e-mail at ldevoe@vhb.com.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Lauren DeVoe, AICP, LEED AP BD+C
Senior Environmental Planner

Enclosure

cc: Tom Evans, Cambridge Redevelopment Authority
Ben Lavery, Boston Properties
Douglas McGarrah, Foley and Hoag
Sean Manning, VHB

Expanded Notice of Project Change

Kendall Square Urban Renewal Project (KSURP) Amendment No. 10

Cambridge,
Massachusetts

Submitted to **Executive Office of Energy and Environmental Affairs**
Massachusetts Enviromental Policy Act Office
100 Cambridge Street, Suite 900 (9th Floor)
Boston MA, 02114

Proponent **Cambridge Redevelopment Authority**
255 Main Street, 4th Floor
Cambridge, MA 02142

Prepared by **VHB**
99 High Street, 10th Floor
Boston, MA 02110

In association with:
Boston Properties
Sasaki Associates
Foley and Hoag
AHA Consulting Engineers
Haley & Aldrich

April 2015

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APPENDICES

Included in this document:

A: NPC Distribution List

B: Most Recent Previous MEPA Certificate

Provided as electronic files on the enclosed CD-Rom (*hard copies are available upon request*):

C: Transportation Supporting Documentation

D: Air Quality and Greenhouse Gas Emissions Assessment Supporting Documentation

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***Note: All supporting graphics are provided at the end of each narrative section.**

Commonwealth of Massachusetts

Executive Office of Energy and Environmental Affairs ■ MEPA Office

For Office Use Only *Executive Office of Environmental Affairs*
MEPA Analyst:
Phone: 617-626-

Notice of Project Change

The information requested on this form must be completed to begin MEPA Review of a NPC in accordance with the provisions of the Massachusetts Environmental Policy Act and its implementing regulations (see 301 CMR 11.10(1)).

EEA # **1891**		
Project Name: **Kendall Square Urban Renewal Project (KSURP) Amendment No. 10**		
Street Address: **Cambridge Center**		
Municipality: **Cambridge**	Watershed: **Boston Harbor (Charles River)**	
Universal Transverse Mercator Coordinates: **UTM 19, 46 60 991 N, 3 11 269 E**	Latitude: **42° 04′ 49″ N** Longitude: **71° 16′ 52″ W**	
Estimated commencement date: **2016**	Estimated completion date: **2024**	
Project Type: **Mixed Use**	Status of project design: **Conceptual/Master Plan**	
Proponent: **Cambridge Redevelopment Authority**		
Street Address: **255 Main Street, 4th Floor**		
Municipality: **Cambridge**	State: **MA**	Zip Code: **02142**
Name of Contact Person: **Thomas L. Evans**		
Firm/Agency: **Cambridge Redevelopment Authority (CRA)**	Street Address: **255 Main Street, 4th Floor**	
Municipality: **Cambridge**	State: **MA**	Zip Code: **02142**
Phone: **617-492-6800**	Fax: **617-492-6804**	E-mail: **tevans@cambridgeredevelopment.org**

With this Notice of Project Change, are you requesting:

a Single EIR? (see 301 CMR 11.06(8)) ☒Yes ☐**No**
a Special Review Procedure? (see 301CMR 11.09) ☐Yes ☒**No**
a Waiver of mandatory EIR? (see 301 CMR 11.11) ☐Yes ☒**No**
a Phase I Waiver? (see 301 CMR 11.11) ☐Yes ☒**No**

Which MEPA review threshold(s) does the project meet or exceed (see 301 CMR 11.03)?

--301 CMR 11.03(1)(b)(7): Approval in accordance with M.G.L. c. 121B of a New urban renewal plan or a major modification of an existing urban renewal plan.
--301 CMR 11.03(5)(b)(4)(a): New discharge or expansion in discharge to a sewer system of 100,000 or more gallons per day of sewage, industrial wastewater, or untreated stormwater.
--301 CMR 11.03(6)(a)(6): Generation of 3,000 or more New adt (unadjusted) on roadways providing access to a single location.
--301 CMR 11.03(6)(b)(15): Construction of 300 or more New parking spaces at a single location.

Which State Agency Permits will the project require?

The proposed amendment to the KSURP requires approval by the Massachusetts Department of Housing

and Community Development (DHCD).

Identify any financial assistance or land transfer from an Agency of the Commonwealth, including the Agency name and the amount of funding or land area in acres:

The Project Change does not require any Financial Assistance or Land Transfer from the Commonwealth.

PROJECT INFORMATION

In 25 words or less, what is the project change? The project change involves . . .
The Project Change involves an amendment to the Kendall Square Urban Renewal Plan (KSURP) to allow an additional approximately 1,034,000 square feet of commercial and residential development.

See full project change description beginning on page 3.

Date of publication of availability of the ENF in the Environmental Monitor: (Date: **06/09/1975**)

Was an EIR required? ☒Yes ☐No; if yes,
was a Draft EIR filed? ☒Yes ☐No
was a Final EIR filed? ☒Yes (Date: **3/15/1977**) ☐No
was a Single EIR filed? ☐Yes ☒No

Have other NPCs been filed? ☒Yes (Date(s): **07/23/92; 08/10/93; 06/24/97; 08/08/01; 01/28/05; 06/15/10**) ☐No

If this is a NPC solely for lapse of time (see 301 CMR 11.10(2)) proceed directly to **ATTACHMENTS & SIGNATURES**.

PERMITS / FINANCIAL ASSISTANCE / LAND TRANSFER

List or describe all new or modified state permits, financial assistance, or land transfers not previously reviewed: **dd w/ list of State Agency Actions (e.g., Agency Project, Financial Assistance, Land Transfer, List of Permits)**

The Project Change requires approval of revision to an urban renewal plan by the Massachusetts Department of Housing and Community Development (DHCD). The Project Change does not require any Financial Assistance or Land Transfer from the Commonwealth.

Are you requesting a finding that this project change is insignificant? A change in a Project is ordinarily insignificant if it results solely in an increase in square footage, linear footage, height, depth or other relevant measures of the physical dimensions of the Project of less than 10% over estimates previously reviewed, provided the increase does not meet or exceed any review thresholds. A change in a Project is also ordinarily insignificant if it results solely in an increase in impacts of less than 25% of the level specified in any review threshold, provided that cumulative impacts of the Project do not meet or exceed any review thresholds that were not previously met or exceeded. (see 301 CMR 11.10(6))
☐**Yes** ☒**No; if yes, provide an explanation of this request in the Project Change Description below.**

The Proponent requests that the Secretary of Energy and Environmental Affairs (EEA) make a finding that the Project Change incorporates measures that adequately minimize or mitigate environmental impacts such that if further MEPA review is required that the filing of a Single Environmental Impact Report (EIR) be acceptable.

FOR PROJECTS SUBJECT TO AN EIR

If the project requires the submission of an EIR, are you requesting that a Scope in a previously issued Certificate be rescinded?
☐**Yes** ☒ **No; if yes, provide an explanation of this request_____.**

If the project requires the submission of an EIR, are you requesting a change to a Scope in a previously issued Certificate?
☐**Yes** ☒**No; if yes, provide an explanation of this request_____.**

SUMMARY OF PROJECT CHANGE PARAMETERS AND IMPACTS

Summary of Project Size & Environmental Impacts	Previously reviewed	Net Change	Currently Proposed
LAND			
Total site acreage	**24 ac.**	**-0-**	**24 ac.**
Acres of land altered	**24 ac.**	**-0-**	**24 ac.**
Acres of impervious area	**19.78 ac.**	**-0-**[1]	**19.78 ac.**
Square feet of bordering vegetated wetlands alteration	**-0-**	**-0-**	**-0-**
Square feet of other wetland alteration	**-0-**	**-0-**	**-0-**
Acres of non-water dependent use of tidelands or waterways	**-0-**	**-0-**	**-0-**
STRUCTURES			
Gross square footage	**3,302,100 GSF**	**±1,034,600 GSF**	**4,336,700 GSF**
Number of housing units	**Up to 185 units**	**±560 units**	**745 units**
Maximum height (in feet)	**249 feet**	**Negligible**	**Up to 250 feet**
TRANSPORTATION			
Vehicle trips per day (unadjusted)	**14,034**	**10,512**	**24,546**
Vehicle trips per day (adjusted)[2]	**10,819**	**3,638**	**14,457**
Parking spaces	**±3,073**	**±740 spaces**	**±3,813**
WATER/WASTEWATER			
Gallons/day (GPD) of water use	**±1.24 mgd**[3]	**±118,740 gpd**	**±1.36 mgd**
GPD water withdrawal	**NA**	**NA**	**NA**
GPD wastewater generation/ treatment	**±0.93 mgd**[3]	**±107,945 gpd**	**±1.04 mgd**
Length of water/sewer mains (in miles)	**NA**	**NA**	**NA**

mgd million gallons daily

1 The Project Change includes redevelopment of approximately 0.27 acres of pervious area to create a new public winter garden as part of the Cambridge Center North Garage Office Buildings, however, efforts to incorporate landscaping and other pervious areas, such as roof gardens throughout the Project Components (in accordance with Plan Amendment open space requirements) are expected to result in a de minimis change in impervious area throughout the KSURP area.

2 Accounts for mode splits and vehicle occupancy rates in order to drive down the actual number of vehicle trips generated by the Project. Based on FST annual reporting projections. The approach to traffic adjustments was based on direction from Cambridge Traffic, Parking & Transportation Department and approved by the Massachusetts Department of Transportation according to their Transportation Scoping Letter (TSL) issued December 4, 2014. Refer to Appendix C for a copy of the TSL.

3 Based on the 1977 FEIR estimates. These estimates were based on the original build-out and do not account for actual water usage and sewage flow or the use of more efficient plumbing fixtures and other water conservation measures implemented over the last 20 years.

Does the project change involve any new or modified:

1. conversion of public parkland or other Article 97 public natural resources to any purpose not in accordance with Article 97? ☐**Yes** ☒**No**

2. release of any conservation restriction, preservation restriction, agricultural preservation restriction, or watershed preservation restriction? ☐**Yes** ☒**No**

3. impacts on Rare Species**?** ☐**Yes** ☒**No**

4. demolition of all or part of any structure, site or district listed in the State Register of Historic Place or the inventory of Historic and Archaeological Assets of the Commonwealth? ☐**Yes** ☒**No**

5. impact upon an Area of Critical Environmental Concern? ☐**Yes** ☒**No**

If you answered 'Yes' to any of these 5 questions, explain below:

PROJECT CHANGE DESCRIPTION (attach additional pages as necessary). The project change description should include:

(a) a brief description of the project as most recently reviewed

(b) a description of material changes to the project as previously reviewed,

(c) if applicable, the significance of the proposed changes, with specific reference to the factors listed 301 CMR 11.10(6), and

(d) measures that the project is taking to avoid damage to the environment or to minimize and mitigate unavoidable environmental impacts. If the change will involve modification of any previously issued Section 61 Finding, include a draft of the modified Section 61 Finding (or it will be required in a Supplemental EIR).

Refer to the *Notice of Project Change Form Narrative/Project Summary* section attached.

ATTACHMENTS & SIGNATURES

Attachments:

1. Secretary's most recent Certificate on this project **Refer to Appendix B.**
2. Plan showing most recent previously-reviewed proposed build condition **Refer to Appendix C.**
3. Plan showing currently proposed build condition **Refer to Figures S.4, 1.1, 1.3, 1.5 and 1.6.**
4. Original U.S.G.S. map or good quality color copy (8-1/2 x 11 inches or larger) indicating the project location and boundaries **Refer to Figure S.1.**
5. List of all agencies and persons to whom the proponent circulated the NPC, in accordance with 301 CMR 11.10(7) **Refer to Appendix A.**

Signatures:

4/8/15		4/8/15	
Date	Signature of Responsible Officer or Proponent	Date	Signature of person preparing NPC (if different from above)
Tom L. Evans, Executive Director		**Lauren DeVoe, Senior Environmental Planner**	
Name (print or type)		Name (print or type)	
Cambridge Redevelopment Authority		**VHB, Inc.**	
Firm/Agency		Firm/Agency	
255 Main Street, 4th Floor		**101 Walnut Street**	
Street		Street	
Cambridge, MA 02142		**Watertown, MA 02472**	
Municipality/State/Zip		Municipality/State/Zip	
617-492-6800		**617-607-0091**	
Phone		Phone	

Notice of Project Change Form Narrative/Project Summary

Pursuant to the Massachusetts Environmental Policy Act (MEPA) and its implementing regulations, the Cambridge Redevelopment Authority (CRA, or the "Proponent") in conjunction with Boston Properties (the "Redeveloper") is submitting a Notice of Project Change (NPC) for an amendment to the Kendall Square Urban Renewal Plan (KSURP) to allow an additional approximately 1,034,000 square feet of commercial and residential development within the Kendall Square neighborhood of the City of Cambridge (the "Project Change" or "Project"). Refer to Figure S.1 for a site location map.

Since the adoption of the KSURP in 1965 and the first Major Plan Amendment in 1977, the Kendall Square area has become a center of innovation, creativity and technology; exceeding the expectation of the planners, designers, and developers in 1960's and 70's. The proposed KSURP Amendment No. 10 will advance the City of Cambridge's (the "City") planning goals for the KSURP (consistent with the recommendations from the 2013 K2C2 Planning Study for the KSURP area) through more efficient and improved use of the Kendall Square area and existing infrastructure. The KSURP will be updated to not only facilitate the job growth and housing opportunities in Kendall Square, but the broader goal of creating a sustainable, inviting, and inclusive neighborhood.

The building construction limit of the KSURP, which has nearly been reached, is proposed to be increased to meet the continued demand for additional housing, office and biotechnology manufacturing space as well as to bring supporting retail to the KSURP area, while also enhancing open space opportunities. New provisions would assist the CRA in linking transit investment to development to ensure that the KSURP area's transit assets grow along with it. Requirements for innovation space, affordable housing, and ground floor retail are included so that Kendall Square remains not only a destination for the great thinkers of today, but also a laboratory for the great ideas of tomorrow and a great urban neighborhood for Cambridge.

The following section provides a summary of the MEPA review and approval history of the KSURP Amendments 1 through 9, describes the existing site conditions, and presents an overview of the Project Change.

Project History, Background, and Status

Kendall Square Urban Renewal Plan

In 1965, the CRA prepared the KSURP, which was approved locally and by the U.S. Department of Housing and Urban Development (HUD). This approval allowed the CRA to carry out the acquisition of 70 parcels of land, relocation of over 100 businesses, demolition of about 100 buildings and clearance of 43 acres of land. The original Kendall Square Urban Renewal Area included land between Main, Third, and Binney Streets as well as the Grand Junction Railroad. Figure S.2 shows the 1976 KSURP area boundary and property acquisition areas. At the time, this area was an industrial and commercial area. The KSURP included that 29 acres of the 43 acres would be redeveloped by the National aeronautics and Space Administration (NASA). By 1970, NASA completed the development of 15 acres of land, including a campus-style complex consisting of one 12-story building and four 1- and 2-story buildings. The remaining 14 acres were planned to be developed by private parties and is currently occupied by the Volpe Transportation Research Center.

On December 29, 1969, NASA then announced that it would not complete its build-out of the 29-acre area because of program cutbacks. Subsequently, NASA transferred its development interests to the Department of Transportation for development by the Federal Government excluding 14 acres of undeveloped land on the north side of Broadway that was transferred back to the CRA in the early 1970s for redevelopment.

In the late 1970s, the CRA and Cambridge City Council engaged the public in a re-planning effort. In 1977, the plan was amended to create the Cambridge Center MXD District to attract mixed-use development to the area north of the Massachusetts Bay Transportation Authority (MBTA) Kendall/MIT Red Line station. The MXD boundary, as shown in Figure S.3, represents the zoning district that was established in the 1970s to help complete the development within the Urban Renewal Area for all of the non-federally owned land. The CRA selected Boston Properties as the master developer of the Cambridge Center Master Plan (described further below).

The KSURP initially consisted of construction of up to 14 buildings totaling approximately 2.77 million gross square feet, three (3) parking garages to support the new buildings as well as public open space (parks, plazas) and other public improvements. The KSURP has been updated/amended a number of times (described more fully below) and, as part of the most recent Plan Amendment No. 8, its timeline for completion was extended to 2020. The 'MEPA Review History' section below describes the Plan Amendments and, subsequently, the 'Site Context and Redevelopment Background' section describes the build-out history of the Cambridge Center Master Plan.

MEPA Review History

The CRA first filed an Environmental Notification Form (ENF) for the KSURP for MEPA review in 1975. MEPA review extended over impacts related traffic, air quality, noise, infrastructure and land. According to the MEPA record, the March 15, 1977 Final Environmental Impact Report (the "1977 FEIR") was found adequate in January 1978.[1] The 1977 FEIR provided for the construction, marketing, and occupancy of 14 buildings totaling 2,773,000 gross square feet plus three (3) parking garages, public open space, including parks and plazas as well as related public improvements all within the KSURP area.

Importantly, the projected vehicle trips per day for the Preferred Plan in the 1977 FEIR (the land use plan that was adopted by the CRA) was 19,300 daily trips. The 1977 FEIR actually reviewed the first KSURP Major Plan Change. This Plan Amendment was a revision of the initial redevelopment program for Kendall Square, which included the NASA Electronic Research Center, and pre-dated MEPA. This Plan Amendment was adopted initially by the Cambridge City Council on February 14, 1977 and then revised on October 31, 1977. The KSURP contained an overall, or aggregate, gross floor area limitation that may float between developments parcels, with further restrictions for certain land, uses both of which have been adjusted over time.

Since the original MEPA approval of the KSURP, the Proponent has regularly consulted with and updated the MEPA office on Plan Amendments No. 2 through No. 8—all of which have been Minor Plan Amendments because they included no changes to the basic elements of the KSURP. In order for the Massachusetts Department of Housing and Community Development (DHCD) to rule on Urban Renewal Plan (URP) changes, the DHCD consults with the Secretary of the Executive Office of Energy and Environmental Affairs (EEA) via MEPA review to confirm a determination of a Minor Plan Amendment. Therefore, with each MEPA submission, the Proponent included a complete and updated analysis of project impacts with a particular focus on analyzing the impact of changes on projected traffic impacts in the KSURP area. Refer to Table S-1 for a summary of the KSURP MEPA review history.

Plan Amendment No. 2

In 1981, MEPA reviewed Plan Amendment No. 2,[2] which adjusted and broadened the permitted mix of uses under the approved KSURP, particularly with respect to the area north of Broadway, but did not increase the maximum allowed GSF under the KSURP. The original FEIR Preferred Plan had envisioned a greater proportion of traditional manufacturing uses than proved feasible during this period of rapid

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[1] Date according to the online MEPA Project Information System, although given the length of time the accuracy of the information is uncertain.
[2] MEPA Certificate issued on September 21, 1981.

changes in technology. Thus, Plan Amendment No. 2 was intended to increase opportunity to develop technical offices and research facilities to respond to the market demands in this area.

Plan Amendment No. 3

In 1993, MEPA reviewed Plan Amendment No. 3,[3] which further adjusted the permitted mix of uses under KSURP, but again did not increase the maximum aggregate GSF of development permitted in the KSURP area. The primary purpose behind the change in Plan Amendment No. 3 was to provide additional flexibility under the KSURP to permit life science companies such as Biogen to locate and expand in the Plan area. It reallocated space under the office and manufacturing use allotment under the Plan and created a new "biotechnology manufacturing uses" category from the former "office uses" category and the overall square footage allowed for this use category was increased from 830,000 square feet to 1,305,000 square feet. Plan Amendment No. 3 also extended the term of KSURP plan until 2010 and increased the permitted maximum building height from 80 to 96 feet. This latter change was meant to accommodate greater floor to ceiling height for laboratory facilities.

The NPC for Plan Amendment No. 3 included a detailed traffic analysis prepared by Fay, Spofford & Thorndike (FST), which reduced the total projected ADVT under the maximum build-out of the KSURP to 13,700 from the 19,300 ADVT projected in the 1977 FEIR. In accepting this analysis, the MEPA approval for Plan Amendment No. 3 required that the Proponent annually update KSURP traffic counts, collect and analyze parking data, and review KSURP tenant surveys, to evaluate over time the reduced traffic and increased transit usage assumptions.

Plan Amendment No. 4

In 1997, MEPA reviewed Plan Amendment No. 4,[4] which increased hotel uses by 190,000 square feet but did not change the maximum allowed GSF under the Plan. Plan Amendment No. 4 also reduced residential uses by 100,000 square feet, retail uses by 20,000 square feet, and office uses by 70,000 square feet to accommodate the added hotel use. The FST analysis that was included with the CRA filing to MEPA projected approximately 13,670 ADVT for Plan Amendment No. 4 under maximum build-out, which was nearly identical to that projected under Plan Amendment No. 3.

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[3] MEPA Certificate issued on September 30, 1993.
[4] MEPA Certificate issued on July 24, 1997.

Table S-1
Summary of MEPA Review History of the KSURP (EEA No. 1891)[1]

Summary of Amendment & Environmental Impacts	Original KSURP (1977 FEIR)	Plan Amendment No. 2	Plan Amendment No. 3	Plan Amendment No. 4	Plan Amendment No. 5	Plan Amendment No. 6[2]	Plan Amendment No. 8[3]	Plan Amendment No. 10 (2015 NPC)
Description	Construction of 14 buildings and three parking garages with open space, parks, plazas and other public improvements.	Adjusted and broadened the permitted mix of uses, but did not increase allowed GSF	Adjusted and broadened the permitted mix of uses (i.e., life sciences), but did not increase allowed GSF. Extended the term of the Plan to 2010.	Reallocated residential, office and retail uses for increased hotel uses, but did not increase allowed GSF.	Added high-rise multi-family residential uses.	Increased biotechnology manufacturing and office uses.	Increased biotechnology and office uses to maximum build-out analysis (for Broad Institute expansion); reduced high-rise multi-family. Extended the term of the Plan to 2020.	Zoning modifications to allow additional office/innovation, retail, and residential uses. Increased parking required to accommodate new uses.
MEPA Approval[4]	January 1978	September 1981	September 1993	July 1997	July 2001	April 2004	June 2010	Anticipated Summer 2015
Total Project Site Acreage	43 acres[5]	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -
Gross Square Footage	2,773,000 GSF	- 0 -	- 0 -	- 0 -	+200,000 GSF	+29,100 GSF	+225,000 GSF[6]	+1,034,600 GSF[7]
Vehicle Trips Per Day (adjusted)[8]	19,300	NA	(-5,600)	(-30)	(-42)	+97	- 0 -	+3,638
Total Parking Spaces	4,300[9]	- 0 -	(-755)	- 0 -	- 0 -	- 0 -	- 0 -	- 0 -[10]

NA Not Applicable
GSF Gross Square Feet
1 Plan Amendment No. 1 was reviewed and approved under the original 1977 FEIR.
2 Plan Amendment No. 7, which increased multi-family residential use was reviewed under MEPA, but was not ultimately adopted by City Council.
3 Plan Amendment No. 9, approved by the CRA in May 2014, was a technical compliance measure with no impacts and, therefore, did not required MEPA review.
4 Dates according to the online MEPA Project Information System, although given the length of time the accuracy of the information is uncertain.
5 Represents developable acreage. The KSURP gross area is 63 acres when accounting for public right-of-way, open space, etc.
6 Reduced high-rise multi-family back to 200,000 GSF, per Plan Amendment No. 5.
7 Refer to Table 1-1 of this NPC for the proposed development program.
8 Accounts for mode splits and vehicle occupancy rates based on trip generation methodology reflecting 20 years of actual traffic trip generation data the FST annual reporting to MEPA. As demonstrated, (refer to Figure 2.1).
9 Represents maximum off-street parking supply permitted by the City and exempted from its parking freeze regulation, as agreed upon by MassDEP.
10 Collectively, the approximately 2,667 existing off-street parking spaces and proposed parking supply for the Project Change (±740 spaces) falls within the maximum off-street parking supply previously approved under Plan Amendment No. 3 (3,545 spaces). All new parking will be structured parking.

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Plan Amendment No. 5

In 2001, MEPA reviewed Plan Amendment No. 5, which added an additional 200,000 square feet of high-rise multi-family residential uses to the maximum build out analysis, bringing the total allowed development in the KSURP area to 2,973,000 GSF. Based upon actual, updated, ADVT information on the KSURP, FST projected that trip generation under a maximum build out under Plan Amendment No. 5 would generate 13,628 ADVT, again a figure nearly identical to that projected under Plan Amendment No. 3.

Plan Amendment No. 6

In 2004, MEPA reviewed Plan Amendment No. 6, which increased the biotechnology manufacturing and offices use category by 29,100 square feet, bringing the maximum build out analysis to 3,002,100 GSF, including the 200,000 GSF of residential use allowed under Plan Amendment No. 5. FST projected that a maximum build out under Plan Amendment No. 6 would generate 13,725 ADVT.

Plan Amendment No. 7

In 2005, MEPA reviewed Plan Amendment No. 7, which proposed to increase the multi-family residential uses approved under Plan Amendment No. 5 by 75,000 square feet. This change would have brought the maximum build out analysis to 3,077,100 GSF. The submission to MEPA for this Plan Amendment included a FST traffic analysis, which projected that a maximum build out under Plan Amendment No. 7 would have generated 14,034 ADVT; however, this Plan Amendment was not ultimately approved by City Council.

Most Recent Previously-Reviewed Proposed Build Condition - Plan Amendment No. 8

The most recently reviewed proposed build condition, Plan Amendment No. 8, was reviewed as part of the NPC filed on June 15, 2010.[5] Plan Amendment No. 8 consisted of an additional 300,000 gross square feet of office and biotechnology manufacturing uses to the maximum build out analysis, extended KSURP for ten years to 2020, and reduced the high-rise multi-family use category back to the original 200,000 square feet approved under Plan Amendment No. 5 (an overall net increase of 225,000 GSF). The increase in the maximum build-out under Plan Amendment No. 8 was intended to accommodate a planned expansion of the Broad Institute, which has been realized (as identified on Figure S.4) and to conform the use categories of the KSURP with City of Cambridge Zoning Ordinance (the "Zoning Ordinance"). The MEPA NPC included

[5] MEPA Certificate issued on June 25, 2010.

an updated FST traffic analysis, which projected that a maximum build-out under Plan Amendment No. 8 would generate 13,6714 ADVT and was based upon trip generation methodology reflecting the 15 years of actual traffic trip generation data.

In March, the CRA approved Plan Amendment No. 9. This Plan Amendment consisted of a technical, conforming language and plan changes to be consistent with Zoning Ordinance changes to use categories adopted the previous year on December 9, 2013, which DHCD approved as a Minor Plan Amendment on May 28, 2014. Because this Plan Amendment was purely "ministerial" in nature and made no changes to the land uses in the KSURP area and, thus, would not result in any environmental impacts, no MEPA review was required. Therefore, for the purposes of this NPC, the most recent previously reviewed project is Plan Amendment No. 8 (the "Prior Project").

Site Context and Redevelopment Background

The approximately 43-acre KSURP area has been undergoing redevelopment since 1965 when HUD approved financial assistance for the plan. The following sections describe the KSURP redevelopment background.

The Cambridge Center Master Plan

Cambridge Center is a major urban mixed-use project being developed by the Redeveloper on a 24-acre site within the 43-acre KSURP area. Initially, the Proponent assembled the sites, managed the acquired properties, provided relocation assistance to on-site businesses, demolished buildings, prepared the sites for redevelopment, constructed public improvements, including infrastructure and selected Boston Properties as the developer (through a public competition). The Proponent continues to supervise the progress of redevelopment of the KSURP area, approves architect and general contractor selections, and is responsible for the installation of all public improvements and for the coordination of local and State approvals.

The Cambridge Center Master Plan, revised to reflect the addition of 200,000 square feet of residential use and 300,000 square feet of office and laboratory space approved by the Planning Board and the City Council and 29,100 square feet by the Zoning Board of Appeals, provides for over 3 million square feet of new development. All individual buildings and open space development are subject to a design review process conducted by the CRA.

Cambridge Center has been designed to accommodate a wide range of complementary uses. Residential space, hotel and retail space, first-class office space and biotechnology laboratory space, in high-rise and mid-rise buildings, is concentrated in the portion of the KSURP area between Main and Broadway (Parcel 4, or the - East Parcel) and on the western side (Parcel 3, or the West Parcel) with views

of the Charles River, Boston and Cambridge. Mid-rise and low-rise, two to seven-story buildings on the ten-acre section north of Broadway (Parcel 2, or the North Parcel) provide space for uses, such as biotechnology research and development and laboratory functions, biotechnology office and manufacturing uses as well as first class office space.

These primary uses are being further complemented by the many services and amenities included in the development: a 431-room Marriott Hotel with a health club, business and conference facilities; a 221-room extended stay Residence Inn by Marriott facility; over 150,000 square feet of retail space offering restaurants, shops and business services; structured parking; direct service by the MBTA Red Line with six (6) MBTA bus routes and a like number of private shuttle buses serving the area. The KSURP area includes over 150,000 square feet of public open space, parks, and plazas.

Completed Development

Cambridge Center's development completed to date includes the properties listed below (in chronological order). Unless otherwise indicated, the buildings at Cambridge Center are owned and managed by the Redeveloper. Noted in parentheses are the new street addresses and garage names associated with the recent rebranding of Cambridge Center. Refer to Figure S.5 for a map key of the Cambridge Center properties.

- **Five Cambridge Center (355 Main Street):** A 236,484 square foot multi-tenant office building completed in the summer of 1981. The building's major tenants include Whitehead Institute for Biomedical Research, VmWare, Arc and Google. Legal Sea Foods occupies 9,100 square feet of the ground floor (over 300 seats).
- **Four Cambridge Center (90 Broadway):** A 198,295 square foot building completed in January 1983. Tenants include Nokia and Akamai Technologies. A restaurant, Meadhall, occupies the ground floor and mezzanine space.
- **Cambridge Center East Garage (the "Green Garage"):** A 804-space parking garage located between Five and Four Cambridge Center opened in April 1983. The garage is completely decked over by a fully landscaped one-acre park approximately 50 feet above grade, easily accessible by three elevators to the general public and Cambridge Center tenants. (Note: The 804-space capacity accounts for the approximately 40 parking spaces will be eliminated upon completion of the recently approved Ames Street Residences described further below).
- **Fourteen Cambridge Center (250 Binney Street):** The first building to be constructed on Parcel 2 north of Broadway was a 62,576-square foot biotechnology office and laboratory facility for Biogen. The building construction was finished in June 1983 and it is managed by Biogen. Major interior renovations were completed in 2002, which expanded the laboratory and research facilities.

- **Eleven Cambridge Center (145 Broadway):** A 78,636-square foot, four-story building on Parcel 2 completed in June 1984 for the headquarters of the Open Software Foundation. Currently, the major tenant is EMC.
- **Nine Cambridge Center (Whitehead Institute):** A 197,519-square foot Whitehead Institute for Biomedical Research located on Parcel 3 completed in the summer of 1984. It is managed and owned by the Whitehead Institute. A 60,000-square foot addition to the original building was completed in 1996.
- **Two Cambridge Center (50 Broadway):** A 431-room, 330,302-square foot, 25-story Marriott Hotel completed in September 1986. The hotel includes a 10,000-square foot ballroom and additional shops, lounges, restaurants, including the recently renovated Champions, banquet facilities and meeting rooms facing the main public plaza. A major lobby renovation was is completed and includes the introduction of a Starbucks facility operated by Marriott staff.
- **Three Cambridge Center (325 Main Street):** A 103,630-square foot, four-story building at the heart of the Cambridge Center complex completed in March 1987. The building consists of office space on floors two through four with an office lobby set symmetrically across a landscaped forecourt from the entrance to Five Cambridge Center, and a major retail facility of The Harvard Cooperative Society at the ground floor and lower level with a main entrance at the eastern end of the building facing the MBTA Kendall Station and the public plaza originally constructed by the CRA. This facility also includes a separate food court with enclosed seating under a glass shed facing the public plaza as well as outdoor seating.
- **One Cambridge Center (255 Main Street):** At the apex of the redevelopment of the KSURP area, facing Boston, began initial occupancy in September 1987. This 12-story, approximately 224,538- square foot building is built, in part, over the MBTA traction power substation and a portion of the low-rise function wing of the hotel. The major tenants are Microsoft Corporation and Brightcove. A branch of the Boston Private Bank and Trust Company opened in October 2001 in ground floor retail.
- **Ten Cambridge Center (105 Broadway):** The third building on Parcel 2 north of Broadway completed in March of 1990 is an approximately 145,603-square foot, seven-story facility, which for ten years served as the national headquarters for Camp Dresser & McKee and is now fully occupied by Biogen.
- **Cambridge Center North Garage (the "Blue Garage"):** Provides parking for approximately 1,136 cars located in the central portion of Parcel 2. Opened in June 1990, this garage features a publicly-accessible perennial garden located at the Broadway frontage.
- **Twelve Cambridge Center (115 Broadway):** The fourth building on Parcel 2, a 148,228-square foot, six-story biotechnology lab and office building, constructed under the terms of a ground lease with the Redeveloper completed by Biogen in 1995. The building is owned, occupied and managed by Biogen.

- **Six Cambridge Center (120 Broadway):** The second building constructed on Parcel 3 is a 185,356-square foot (221 rooms), 15-story extended stay hotel owned by RLJ Development, LLC and operated by the Marriott as a Residence Inn. Construction commenced in November 1997 and the initial opening occurred on February 1, 1999. The building has 2,000 square feet of ground floor space, which is occupied by Starbucks.
- **Eight Cambridge Center (150 Broadway):** The third building to be constructed on Parcel 3 is a 176,868-square foot, nine-story office building that serves as the international headquarters for Akamai Technologies occupying the entire building. Construction commenced in February 1998 and was initially occupied in June 1991 by Cambridge Technology Partners, now Novell.
- **Fifteen Cambridge Center (125 Broadway):** The sixth building on Parcel 2 is a 211,406-square foot, six-story research and development building built under the terms of a ground lease by and between the Redeveloper and Biogen. Initial construction activities commenced in July 1999 and the building was completed in January 2001. Biogen occupies, owns and manages the facility.
- **Twelve Cambridge Center (115 Broadway) – Expansion:** The seventh building on Parcel 2 is a 96,537-square foot, six-story biotechnology lab and office building constructed under the terms of a ground lease with the Redeveloper. It has a unique co-generation plant supplying all energy services for Biogen's occupied approximately 800,000 square feet of real estate. Initial occupancy commenced in January 2006. The building is owned, occupied and managed by Biogen.
- **Seven Cambridge Center (415 Main Street)**: The fourth building on Parcel 3 consists of 187,500 square feet of research and development and 11,818 square feet of retail uses in a 7-story building, which is master leased to MIT and occupied by the Broad Institute. The building is owned by the Redeveloper and managed by the Broad Institute. Initial occupancy began in March 2006.
- **Cambridge Center West Garage – Phase I (the "Yellow Garage"):** A 727-space parking garage located between Six and Seven Cambridge Center. Construction was substantially completed and the garage was opened in October 2005.
- **Broad Institute Expansion:** An approximately 244,000-square foot office and laboratory space expansion at the Broad Institute's 75 Ames Street building.
- **Seventeen Cambridge Center (BioGen/300 Binney Street)**: An approximately 195,191-square foot research and development center constructed in 2013 for Biogen. The building also includes a daycare on the first floor.
- **Ames Street Residences:** A 200,000-square foot (280 units) residential building planned at 88 Ames Street between Four and Five Cambridge Center.

Gross Floor Area of Development

Upon completion of the Project Change (described further below), in addition to the structured parking garage, the gross floor area of development, by uses, is projected in Table 1-2 below.

Table 1-2 Gross Floor Area of Development

Use	Gross Floor Area (SF)
Biotech Office/Manufacturing	1,373,845[1]
General and Technical Office	1,169,822
Retail	72,455
Residential	**200,000**
Business Hotel	185,356
Hotel	330,302
Total	**3,331,780**

Note: Uses in **bold** are projected.

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Fourteen Cambridge Center @	62,576
Nine Cambridge Center @	197,519
Twelve Cambridge Center @	148,288
Fifteen Cambridge Center @	211,406
Seven Cambridge Center @	187,519
Twelve Cambridge Center/II @	96,537
Seventeen Cambridge Center @	170,000
	1,373,845

Public and Open Space Improvements

The Proponent constructed basic public improvements throughout the KSURP area, including new streets, and a major park/fountain/artwork amenity at the apex of Parcel 4, completed in June 1990, and dedicated as the Thomas J. Murphy Park, planted median strips, brick sidewalks, a heavily-landscaped Pedestrian Walkway and other street trees, furniture and landscaping. Basic infrastructure improvements and the construction of a new street network, tree planting, median strips and traffic improvements were completed.

In addition to required open space for each building, Boston Properties has constructed and maintains publicly accessible open space throughout Cambridge Center. These include Danny Lewin Park on Parcel 3 between Six and Eight Cambridge Center, North and South Parks located on the north and sides of the North Garage, respectively, and the Kendall Center Roof Garden on top of the Cambridge Center East Garage. Over 150,000 square feet of open space has been constructed to date – already exceeding the 100,000 square foot zoning requirements. It is anticipated that this base requirement may be tripled as part of the Project Change. At the present time, the Proponent is examining with all abutters the potential for a linear park extending along the railroad land from Main Street to Binney Street and a "Gateway" project at the Longfellow Bridge.

A major transit public plaza, framed by the Marriott Hotel at Two Cambridge Center, and One and Three Cambridge Center on Parcel 4, was initially constructed (and owned) by the Proponent. The plaza provides an important urban outdoor space, and setting for outdoor dining and scheduled activities. The plaza is currently programmed and maintained by the Redeveloper (Boston Properties). In 2011, this plaza was redesigned and reconstructed by the Redeveloper and in 2013, ownership was transferred from the CRA to Boston Properties.

Parking

Off-street parking is currently provided in the form of three parking garages for a total of approximately 2,667 spaces some limited interim on-grade parking. The first garage, the 804-space Cambridge Center East Garage (now referred to as the "Green Garage") opened in April 1983, and is located on Parcel 4 between the Four and Five Cambridge Center. The second garage, the 1,36-space Cambridge Center North Garage (now referred to as the "Blue Garage"), was built to the northwest of the first garage on Parcel 2 in an interior area formed by the Ten, Eleven, Twelve and Fourteen Cambridge Center. A third garage, the 727-space Cambridge Center West Garage (now referred to as the "Yellow Garage"), was constructed in 2004-2005 and is located in the center of Parcel 3 between Six and Seven Cambridge Center. All garages accommodate bicycles with a total of 215 dedicated spaces that are secured.

As provided for in the applicable MXD zoning regulations governing development in Kendall Square, each of the parking garages is operated on a pooled basis, serving tenants in a number of different Cambridge Center buildings. In addition to providing parking to tenants under long-term leases, the parking garages will also offer visitor parking, and daily and monthly leased parking to tenant's employees.

Mass Transit

The reconstruction of the Kendall Square station and the construction of a new traction power substation on the MBTA Red Line is completed. This work consisted of new construction of an extension of the platform capacity and two station entrances and total modernization of the station. The new station entrances, which connect directly into Cambridge Center, opened in the spring of 1987.

Four (4) connecting bus lines operate within a ¼-mile of the KSURP area (as shown in Figure 2.4) as do a similar number of free private shuttle buses, including one connecting to the nearby CambridgeSide Galleria Mall in East Cambridge. This shuttle serves over 60,000 riders each month. Since January 2002, Charles River Transportation Management Association has run EZRide, a publicly-assisted, privately-funded shuttle service connecting the north side Commuter Rail lines, Orange/Green Line at North Station and Boston with the Red Line (Kendall Square) and University Park at MIT. EZRide had a ridership of 145,000 for the year 2004, with

a daily ridership of 580 and a weekly ridership of 2,900. For 2010, the projected ridership is 425,000, with a daily ridership of 1,700 and a weekly ridership of 8,500. The location of the Kendall Square transit station was one of the key elements in the decision to renew Kendall Square and to develop Cambridge Center.

Existing Site Conditions

The specific parcels subject of the Project Change include three (3) key parcels within the existing Cambridge Center complex:

- Cambridge Center North Garage;
- Eleven Cambridge Center; and
- Three Cambridge Center.

Additionally, the existing Whitehead Institute building at Nine Cambridge Center and Broad Institute at 75 Ames Street are also included as part of the Project Change because they involve changes to previously reviewed and approved uses (described further under the 'Project Change Overview' section below). Refer to Figure S.4 for the Project Components. The existing conditions for each subject parcel or building are described in the following sections.

Cambridge Center North Garage

The Cambridge Center North Garage is a 6-story approximately 92,000-square foot parking facility located at 121 Broadway and 280 Binney Street. The garage is surrounded on all sides by commercial office and biotech lab space. Refer to Figure S.6a for the existing conditions for the North Garage. Access to the garage is through roadways on either side of the garage that connect to Binney Street to the north and Broadway to the south. The land at the north and south ends of the garage is improved with landscaped areas, benches, and walkways. A large steam line runs through the garage property below the ground floor slab contained within a 30-foot wide utility easement.

Eleven Cambridge Center

The Eleven Cambridge Center site consists of approximately 37,862 square feet of land with an approximately 76,600-square foot commercial office building located at the corner of Broadway and Galileo Galilei Way. Refer to Figure S.6a for the existing conditions for Eleven Cambridge Center. The site is bordered by a tree lined landscaped area and Fifteen Cambridge Center to the north, the North Garage to the east, Broadway to the south and Galileo Galilei Way to the west. A large diameter drainage culvert exists parallel to Broadway below the sidewalk. The culvert leads directly to the Charles River located approximately 0.4 mile to the east. The drainage

culvert also served historically as an aqueduct connecting the former industrial complex at One Kendall Square to the Charles River supplying cooling water to the facility.

Three Cambridge Center

The Three Cambridge Center consists of approximately 28,822 square feet of land with an approximately 105,100-square foot office building located at 247 Main Street. Refer to Figure S.6b for the existing conditions of Three Cambridge Center. The site is bordered by the Marriott Hotel (Two Cambridge Center) to the north, a paved courtyard to the east (shared with One and Two Cambridge Center), Main Street to the south across which there is an office/retail building, a bank, a hotel (formerly a fire station) and an entrance to the MBTA Red Line Kendall Square/MIT station, and Five Cambridge Center to the west. The MBTA Redline subway tunnel runs beneath Main Street adjacent to Three Cambridge Center. An entrance/exit headhouse is located in the adjacent courtyard area.

Whitehead Institute and Broad Institute Buildings

Figure S.6c shows the existing site conditions of the Whitehead Institute building and Broad Institute sites. The Whitehead Institute is an approximately 200,000-square foot existing commercial building with research and development/laboratory uses located at Nine Cambridge Center at the corner of Main Street and Galileo Galilei Way. Constructed in 2006, the approximately 246,000 square feet Broad Institute building located at 75 Ames Street was the subject of Plan Amendment No. 8 (the most recently previously reviewed project under MEPA).

Project Change Overview

The proposed Plan Amendment No. 10 includes the following elements:

- Updates to Goals and Objectives;
- Allow for additional development;
- Implement K2 Plan Overlay Policies (which aim to: (i) balance commercial and residential uses; (ii) incentivize ground floor retail; (iii) require innovation space; and (iv) incorporate sustainable measures);
- Establish housing policies;
- Create a transit investment tool; and
- Establish a coordinated Design Review Process.

Chapter 1, *Project Change Description* of this NPC provides a detailed description of the proposed material changes to the KSURP, which are the subject of MEPA review (i.e., additional development and associated potential impacts). The Project Change consists of a Major Plan Amendment to the KSURP to allow up to 1,034,000 square feet of net new commercial and residential development. The Project Change aims to encourage new development in the form of the following key components (the "Project Components"):

- Cambridge Center North Garage Office Buildings;
- Eleven Cambridge Center Residential Building; and
- Three Cambridge Center Mixed Use Building.

Additionally, the existing Whitehead Institute building at Nine Cambridge Center and Broad Institute at 75 Ames Street are also included in this MEPA review because they involve changes to the build-out under the KSURP. The Whitehead Institute consists of an expansion of an existing use (an approximately 60,000-square foot commercial office/lab addition) and the Broad Institute proposes a change in use to their existing facility (conversion of approximately 15,100 square feet of mechanical space to commercial office space). These components will be undertaken by other parties separate from the Redeveloper (referred to herein as "Other Developers"). Refer to Figure S.4 for the Project Components. Refer to Chapter 1, *Project Change Description* for additional detail on each Project Component.

Summary of Potential Impacts and Proposed Mitigation

This section summarizes the key findings of the environmental impact analyses conducted for the Project Change. Chapter 9, *Summary of Proposed Mitigation and Beneficial Measures* of this NPC provides a summary of public benefits and a comprehensive discussion of the proposed mitigation associated with the Project Change.

Transportation

- Traffic operations within the KSURP area have been monitored by FST since the approval of Plan Amendment No. 3 in 1993, as required by MEPA.
- The history of the KSURP with the MEPA process, as documented by the FST analysis, has consistently shown that actual trip generation in Kendall Square is significantly lower than accepted methodology for average daily vehicle trip projections due to the high proportion of alternative modes, including transit, walk and bike, by commuters, shoppers, visitors, and residents in Kendall Square.
- When taking the historic FST traffic monitoring data and adjustments for area-specific mode splits and vehicle occupancy rates (that more accurately represent

the actual number of vehicle trips to be generated), the Project will generate an estimated 3,638 adjusted vehicle trips.

- While the Project will add traffic to the 13,714 average vehicle trips per day projected by FST under Amendment No. 8, the estimated total number of vehicle trips per day to the KSURP area is estimated to total 17,352, which is still approximately 10 percent less the projected 19,300 vehicle trips estimated in the 1977 FEIR.
- The Proponent proposes to establish a program in conjunction with MassDOT, MBTA and other stakeholders (the Enhanced Transit Mitigation Program) designed to enhance mobility around the KSURP area, including major transportation initiatives that will improve transit options and services.
- The Project will improve access and circulation through intersection improvements to the local roadway network as well as pedestrian and bicycle facilities.
- The Project will include a robust TDM plan to reduce single-occupancy vehicles traveling to/from the KSURP area.
- The Proponent will continue to implement a Transportation Monitoring Program (TMP) to assist in determining the effectiveness of TDM initiatives and traffic mitigation improvements.
- Collectively, the actual approximately 2,667 existing off-street parking spaces with the proposed 740 new off-street parking spaces falls within the maximum off-street parking supply previously approved under Plan Amendment No. 3 (3,545 spaces).

Air Quality

- The air quality assessment demonstrates that the Project complies with local, state, and federal air quality requirements.
- The Project is consistent with the guidelines of MassDEP because the Project will incorporate reasonable and feasible mitigation measures to reduce VOC and NO_x, emissions in the ozone mesoscale analysis.
- The proposed transportation-related mitigation and beneficial measures will have local and regional air quality benefits as they aim to reduce the amount of vehicle trips to/from the KSURP area, which results in reduced vehicle air emissions.

Greenhouse Gas Emissions

- Through the implementation of a comprehensive design strategy, including responsive mitigated design and operational commitments, the Project is expected to result reductions in GHG emissions consistent with the MEPA

Greenhouse Gas Emissions Policy and Protocol.

- All Project Components will meet the current Stretch Energy Code requirements, where applicable (i.e., achieve at least a 20 percent overall reduction in annual energy use compared to a baseline using requirements of ASHRAE 90.1-2007).
- The Proponent has considered additional energy efficiencies that may be required to meet the future potential Stretch Energy Code (i.e., approximately 15 percent more efficient than the IECC2012 and ASHRAE standard 90.1-2010, which is the current state-wide Base Energy Code).
- As demonstrated by the stationary source GHG assessment, overall the Project will achieve an estimated 17.2 percent reduction in stationary source CO_2 emissions by reducing overall energy consumption by approximately 25.1 percent through the implementation of energy optimizing building design and systems. (Note, the percentages of energy use are different than emission reductions due to emissions conversion factors.)
- The Project consists of urban infill with dense, high-efficient buildings, a building reuse component (the North Garage Office Buildings) and reduced single-occupancy vehicle trips through alternative modes of transportation—all of which result in significantly less GHG emissions compared to a suburban "greenfield" development.
- Achieving reduction of 105 tons per year in mobile source GHG emissions by implementing the traffic mitigation measures.

Stormwater Management

- As the KSURP area is predominantly impervious, discharges are representative of a highly developed urban area in rate and water quality.
- Each Project Component will be required to mitigate stormwater runoff to comply with City and MassDEP standards.
- Stormwater infrastructure will be designed and installed for each Project Component to reduce the runoff discharge rate and improve the quality of the runoff to the City's stormwater system and the Charles River basin.
- The incorporation of green roofs and rainwater harvesting tanks into building design will be considered.
- Where possible, the Proponent will coordinate with the City to explore creative solutions to stormwater management that go beyond the scope of individual Project Components to provide a more district-wide solutions.

Water and Wastewater

- As part of the initial implementation of the KSURP, utility systems were rebuilt in the KSURP area in the 1960's and 1980's. Furthermore, the DPW and Cambridge Water Department (CWD) have invested in several projects in recent years to improve capacity issues in the Kendall Square neighborhood.
- The Project will infill the heavily developed area and, therefore, will benefit from infrastructure improvements implemented as part of the KSURP.
- The Project will require an estimated 118,740 gallons per day of potable water and is projected to generate approximately 107,945 gallons per day of wastewater.
- The Project will be required to mitigate its contributions of stormwater from the local sewer system at a ratio of 4:1 (an estimated 431,780 gallons per day).
- The Proponent will coordinate all sewer connections to City infrastructure with the City, as required by the DPW, as designs progress.
- The Project will attempt to conserve water through several methods, including low-flow plumbing fixtures, efficient air conditioning systems and efficient landscape irrigation practices.

Hazardous Materials

- The Project Component sites have either achieved regulatory closure under the MCP or were developed prior to the adoption of the Massachusetts Contingency Plan in 1988.
- It is anticipated that a majority of the historic fill and underlying soils will be impacted with petroleum oils and hazardous materials and, therefore, characterization of soil materials in-place prior to excavation is planned as part of the Project.
- It is anticipated that contaminated groundwater will also be encountered and that treatment of construction dewatering effluent will be required.
- The management of contaminated soil and groundwater, and implementation of measures to reduce the risk of exposure to contaminants at each Project Component site will be conducted under a Release Abatement Measure (RAM) Plan. It is anticipated that the measures undertaken under the RAM will result in achieving a Permanent Solution for each property redevelopment.

Construction

- The Project will be construction in two key phases where Phase 1 will be split into two sub-phases.
- Temporary construction-period impacts (typically related to stormwater runoff,

truck traffic, air quality/dust, noise and construction waste) will be managed to minimize disruption to the surrounding neighborhood through the preparation of Construction Management Plans for each Project Component in coordination with the City.

- The Proponent, Redeveloper and Other Developers will all work with the City, MBTA and local community to coordinate construction and seek to minimize any impacts from demolition and construction of new buildings (specifically, during Phase 2 to minimize impacts to the Kendall Square/MIT subway station entrance/exit headhouse located in the courtyard area adjacent to Three Cambridge Center).

Analysis of Relevant MEPA Project Change Factors

The technical analyses accompanying this "expanded" NPC demonstrate that the Project Change does not result in any new significant environmental impacts (that have not been or are not addressed with mitigation) beyond those documented and analyzed in the most recently previously reviewed filing. The Proponent requests a finding that the Project Change incorporates measures that adequately addresses environmental impacts such that a Single Environmental Impact Report is required. The Proponent is not requesting a finding that the Project Change is "insignificant" pursuant to the relevant MEPA regulatory provisions (301 CMR 11.10).

The Project Change will potentially result in environmental impacts associated with up to 1,034,000 square feet of net new development; however, as demonstrated herein, the Project incorporates measures to avoid, minimize, or mitigate all areas of potential environmental impact (i.e., local roadway improvements, stormwater management facilities). The expansion of the Project represents an approximately 31 percent increase in allowable development compared to what was has been approved through Plan Amendment No. 8 (up to approximately 3.3 million square feet). No new MEPA review thresholds or Mandatory Environmental Impact Report (EIR) review thresholds are triggered as a result of the Project with the exception of Transportation-related thresholds (new unadjusted daily traffic and new parking spaces).

The following sections provide an evaluation of the significance of the Project Change under the relevant factors/considerations set forth in the MEPA regulations under 301 CMR 11.10(6).

Expansion of the Project

The Project Change will result in up to 1,034,000 square feet of new commercial and residential development. This represents an approximately 31 percent increase in

overall currently allowable square footage approved as part of the Plan Amendments for an overall total of up to approximately 4,446,700 gross square feet of development.

Generation of Further Impact

No new MEPA review thresholds are triggered as a result of the Project Change. The only Mandatory Environmental Impact Report (EIR) review thresholds exceeded are Transportation thresholds for new traffic and parking spaces.

Traffic

As described in Chapter 2, *Transportation and Parking* of this NPC, traffic operations within the KSURP area have been monitored by FST since their initial traffic analysis for Plan Amendment No. 3. In accepting this analysis, the MEPA approval for Plan Amendment No. 3 required that the CRA annually update KSURP traffic counts, collect and analyze parking data, and review KSURP tenant surveys to evaluate over time the reduced traffic and increased transit usage assumptions. The Proponent has been reporting on area traffic volumes and parking garage usage since the approval of Plan Amendment No. 3 in 1993. The FST reports have consistently shown that actual trip generation in Kendall Square is significantly lower than accepted methodology for average daily vehicle trip (ADVT) projections (as shown in Figure 2.1).

The conclusions summarized in the ongoing traffic FST reports can be used to better forecast trips associated with the Project Change. While traffic will increase as a result of the additional development, it will be at a lower rate than the standard Institute of Transportation (ITE) Trip Generation Manual rates (unadjusted) due to consideration of mode-share and the implementation of aggressive TDM measures, which have been successful at reducing traffic compared to what was historically projected for the KSURP area. Taking these factors into consideration, the Project Change will generate an estimated 3,638 ADVT. Adding this traffic to the 13,714 ADVT, as projected by FST under Plan Amendment No. 8, the overall estimated number of vehicle trips per day generated by the KSURP area redevelopment is 17,352. With the Project Change presented herein, the estimated future number of vehicle trips to the KSURP area remains less (by approximately ten percent) than the originally projected 19,300 vehicle trips. (Note: The approach to traffic adjustments was based on direction from the Cambridge Traffic, Parking & Transportation Department and approved by the Massachusetts Department of Transportation according to their Transportation Scoping Letter [TSL] issued December 4, 2014. Appendix C includes a copy of the TSL.)

The Proponent and the Redeveloper remain focused, as they have throughout the development of Cambridge 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 area. It is acknowledged and well documented

that an estimated 70 percent of trips travelled to Kendall Square utilize transit, walking, biking, shuttle and/or carpooling. 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 Proponent's plans for expansion of the KSURP.

Parking

The Project includes an additional 740 parking spaces all of which will be structured parking. The additional parking proposed as part of the Project is expected be shared parking among employees and residents within the area. Collectively, the approximately 2,667 existing off-street parking spaces and proposed parking supply for the Project Change falls within the maximum off-street parking supply previously approved under Plan Amendment No. 3 (3,545 spaces). This change in parking represents a 0.35 percent decrease in the maximum off-street parking supply originally contemplated for the KSURP area (4,300 spaces).[6]

The City has recommended new zoning requirements under the K2 Plan for parking standards in the area. New office and retail uses have no minimum parking requirement, but instead a maximum parking ratio. Additionally, the Proponent is considering reducing the residential parking requirement on current trends within the area. Refer to Chapter 2, *Transportation and Parking* of this NPC for further details on the proposed parking supply for the Project Change.

Change in Schedule

The Project Change includes extending the completion date for the full build-out to 2030 from 2020, as previously approved under Plan Amendment No. 8.

Change in the Project Site

The Project Change does not result in a change in the KSURP area as the subject parcels fall within the previously reviewed and approved KSURP area (Figure S.2).

Need for New Permits

No new or amended state permits are required for the Project Change.

[6] This maximum parking supply represents spaces permitted by the City and exempted from its parking freeze regulation, as agreed upon by MassDEP.

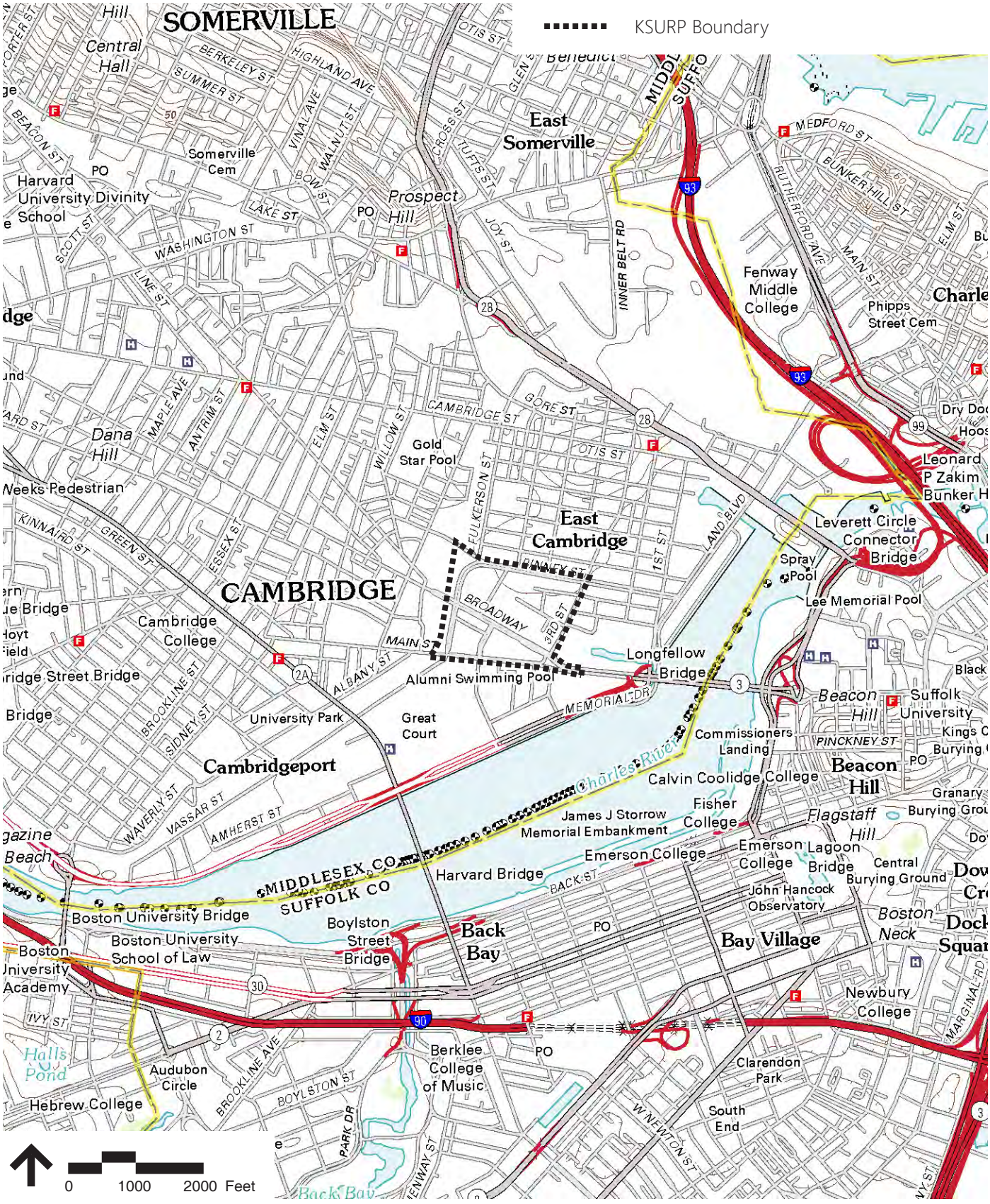

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Figure S.1
Site Location Map

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge GIS, MassGIS

URBAN RENEWAL AREA BOUNDARY

ACQUIRED BY CRA

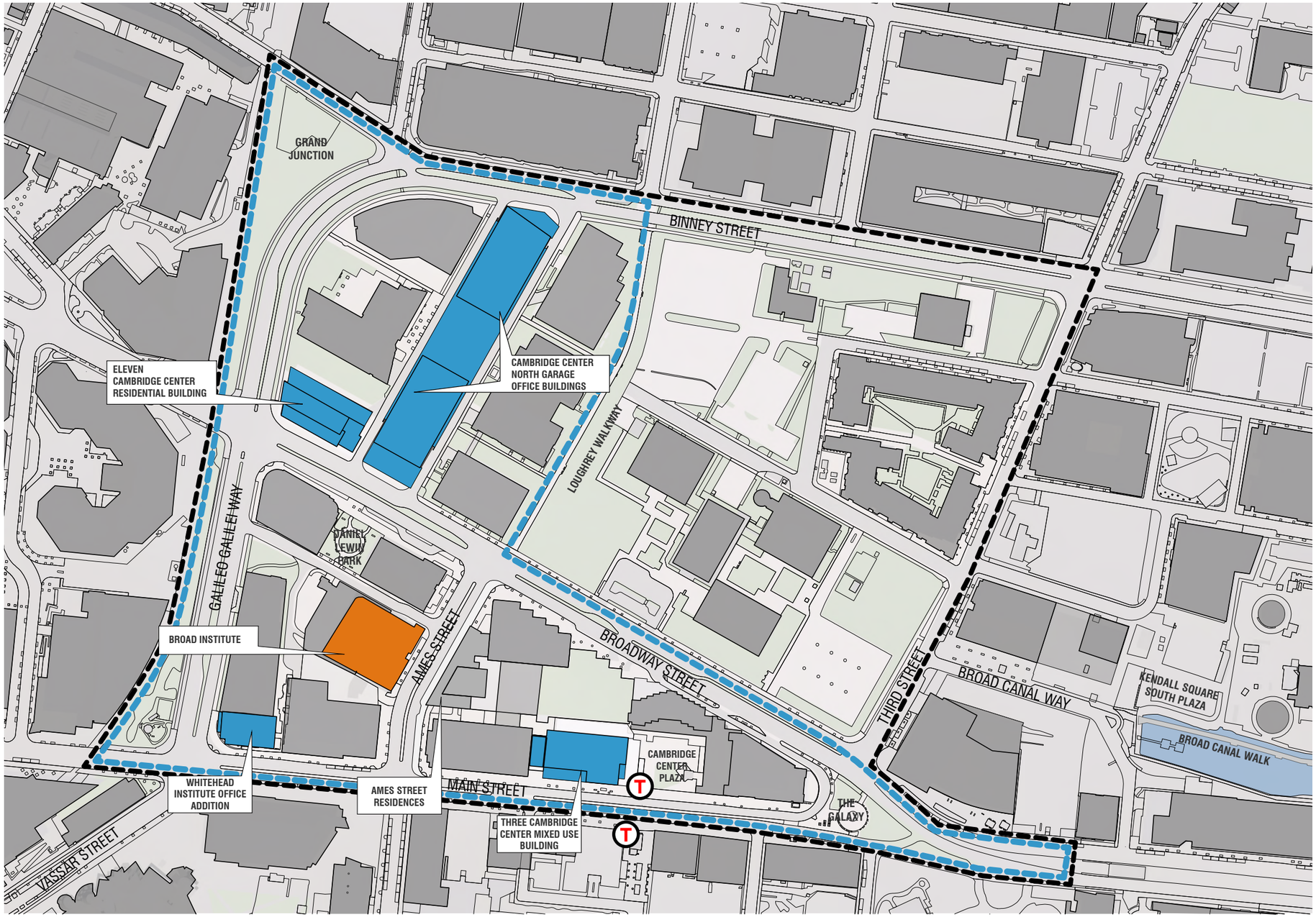
TO BE ACQUIRED BY CRA

CRA

Figure S.2
1976 KSURP Boundary and Property Acquisition Areas

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: Cambridge Redevelopment Authority



Source: Sasaki Associates

0 100 200 Feet

LEGEND

- KSURP Boundary
- MXD Boundary
- Project Most Recently Previously Reviewed by MEPA
- Project Change (referred to herein as the Project Components)

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Figure S.4

Previously Reviewed Project and Proposed Project Change

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

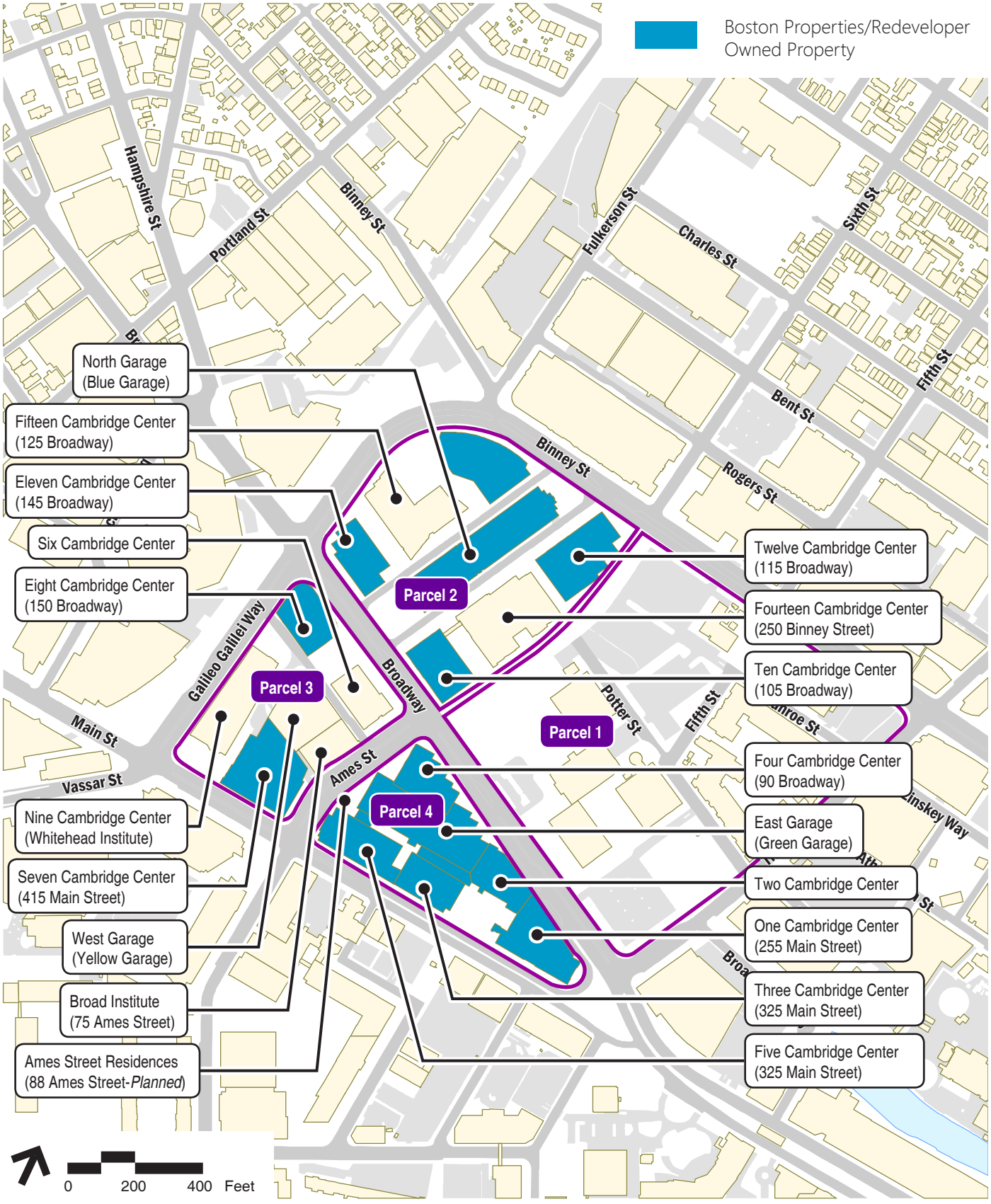

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Figure S.5
Cambridge Center Properties Key Map

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge GIS, MassGIS

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Figure S.6a
Existing Conditions - North Garage & Eleven Cambridge Center

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

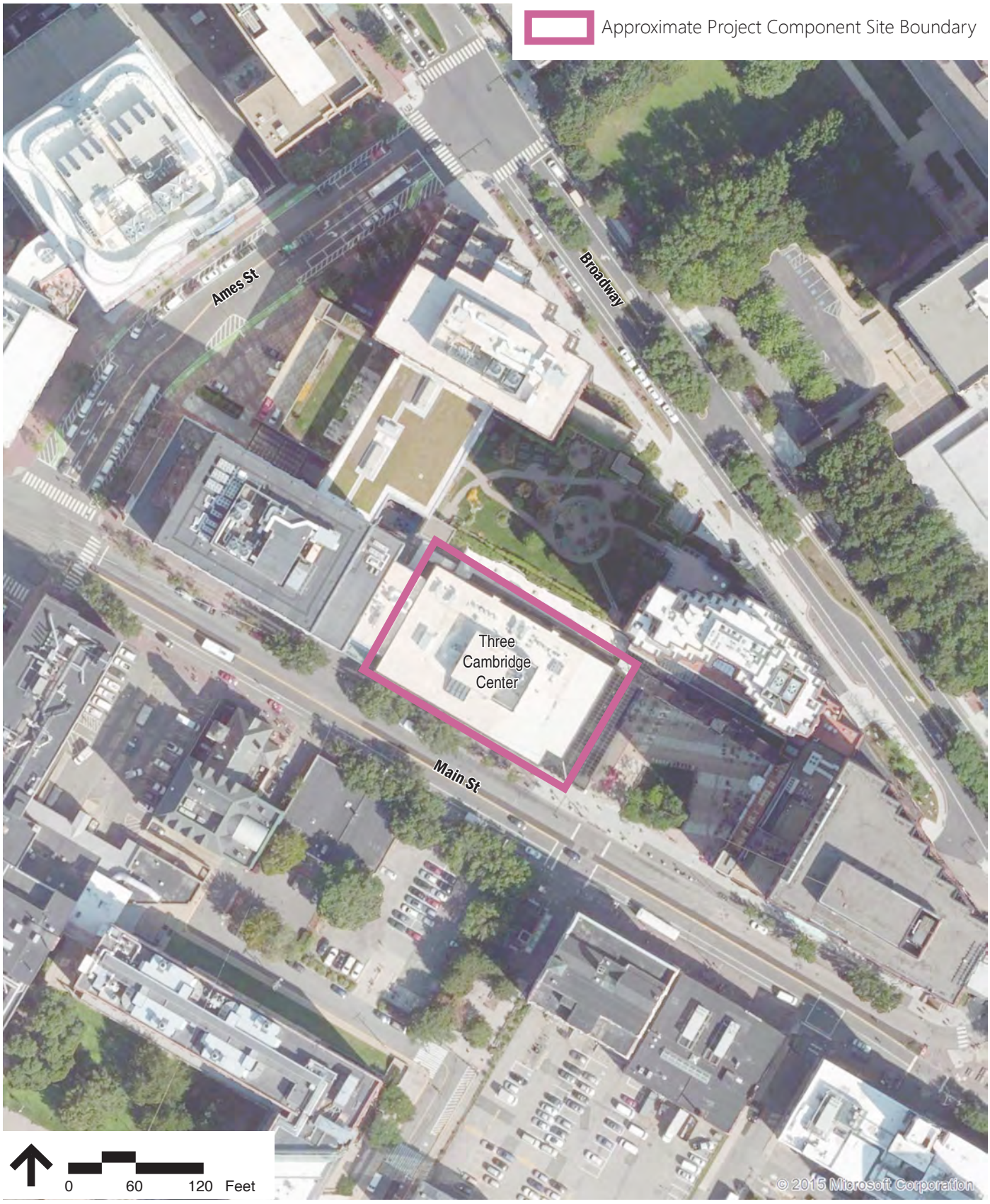

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Figure S.6b
Existing Conditions - Three Cambridge Center

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

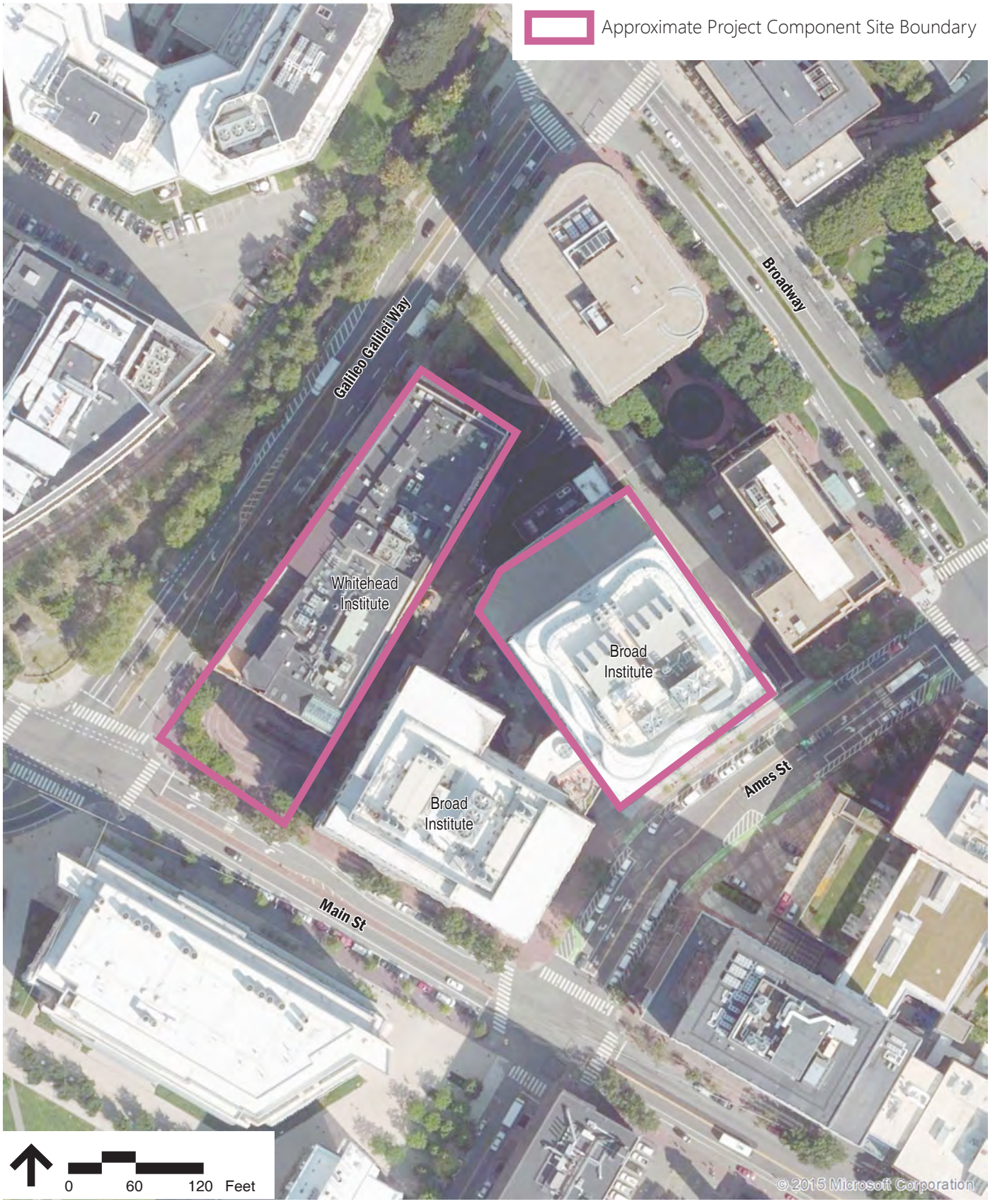

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Figure S.6c
Existing Conditions - Whitehead & Broad Institute Buildings

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

1

Project Change Description

Introduction

The CRA, as the Proponent, in conjunction with Boston Properties, as the Redeveloper, submits this NPC for a Major Change to the KSURP—Plan Amendment No. 10 (referred to herein as the "Project Change" or "Project") to allow an additional approximately 1,034,000 square feet of commercial and residential development as a continuation of the enhancement of Kendall Square. The KSURP was originally reviewed and approved under MEPA in 1977 (EEA No. 1891) and has undergone a number of Plan Amendments, as described in detail in the *Notice of Project Change Form Narrative/Project Summary*.

The Project provides a significant opportunity to continue the success of the KSURP. As the development plan described in the original 1976 KSURP and subsequent Plan Amendments has been realized over the years, Cambridge Center and the Kendall Square area have become a hub for biotechnology and information technology as well as innovative start-up companies and work-renowned academic and research facilities. However, there continues to be a desire to transform Kendall Square into more of a 24/7 mixed use neighborhood by introducing more residents, retail and other services to support them as well as the thousands of weekday employees. The following chapter presents a detailed description of the Project, which aims to create such a place.

Project Change Description

The Project consists of an amendment to the KSURP to allow up to 1,034,000 square feet of net new development. As shown in Figure S.4, the Project aims to encourage new development in the form of the following Project Components:

- Cambridge Center North Garage Office Buildings;
- Eleven Cambridge Center Residential Building; and

- Three Cambridge Center Mixed Use Building.

Table 1-1 below presents the proposed development program.

Table 1-1 Proposed Development Program

Project Component/Phase	Size/Quantity	Building Height[1]
Phase 1A – Cambridge Center North Garage Office Buildings		
Commercial Office	546,000 GSF	Office Building A = 226 feet 13 stories
Innovation Space	39,000 GSF	
Retail	5,000 GSF	Office Building B = 115 feet 8 stories
NET NEW Phase 1A	*590,000 GSF*	
Phase 1B – Eleven Cambridge Center Residential Building		
Existing Eleven Cambridge Center Commercial Office (to be demolished)	(76,600 GSF)	249 feet 22 stories
Residential	210,000 GSF (294 units)	
Retail	25,000 GSF	
NET NEW Phase 1B	*158,400 GSF*	-
TOTAL NET NEW Phase 1	*748,400 GSF*	-
	740 parking spaces	
Phase 2 – Three Cambridge Center Mixed Use Building		
Existing Three Cambridge Center Commercial Office (to be demolished)	(105,100 GSF)	250 feet 19 stories
Residential	190,000 GSF (266 units)	
Commercial	106,200 GSF	
Retail	20,000 GSF	
TOTAL NET NEW Phase 2	*211,100 GSF*	
Other Development		
Whitehead Institute Addition[2]	60,000 GSF	
Broad Institute Office Conversion[3]	15,100 GSF	NA
TOTAL NET NEW Other Development	*75,100 GSF*	-
TOTAL (NET NEW)	**1,034,600 GSF**	-
	584,600 GSF Office[4]	
	50,000 GSF Retail	
	400,00 GSF Residential (560 units)	
	740 spaces	

1 Allowable height up to 300-350 feet, as currently proposed in the Plan Amendment No. 10.
2 To the existing facility at Nine Cambridge Center.
3 Accounts for the conversion of existing mechanical space to be re-purposed/fit-out into leasable commercial office space at the Broad Institute's 75 Ames Street location.
4 Includes Innovation Space.

Additionally, the existing Whitehead Institute building at Nine Cambridge Center and Broad Institute at 75 Ames Street are also included in this MEPA review because they involve changes to the build-out under the KSURP. The Whitehead Institute consists of an expansion of an existing use (an approximately 60,000-square foot commercial office/lab addition) and the Broad Institute proposes a change in use to their existing facility (conversion of approximately 15,100 square feet of mechanical space to commercial office space) to be undertaken by the Other Developers.

The KSURP regulates the level of development through a cap on aggregate Gross Floor Area (GFA) of all land uses in the KSURP area. The level of development is further restricted through use limitation of land use groups and Floor Area Ratio (FAR) controls by land use. These three tiers of regulations are designed to provide flexibility in the distribution of development throughout the KSURP area while maintaining a balance of land use in the KSURP area. These regulations are repeated in the Cambridge Center Mixed Use District (MXD) of the Zoning Ordinance.

The proposed amendment to the KSURP includes a few exemptions to the GFA caps namely:

- 50 percent of the Innovation Office Space,
- Ground floor retail that is sub-divided into establishments of 10,000 square feet or less, and
- Housing units that are permanently restricted to Middle Income households.

Thus, the total GFA allowance in Plan Amendment No. 10 provides approximately 635,000 square feet of net new commercial development and 400,000 square feet of residential development. The analysis of environmental impacts provided herein includes anticipated square footage beyond these GFA caps that would take advantage of the proposed exemptions; 19,500 square feet of Innovation Space and 20,000 square feet of ground floor retail space.

Project Components

The following sections describe each Project Component in further detail.

Cambridge Center North Garage Office Buildings

Figure 1.1 presents the proposed Cambridge Center North Garage Office Buildings massing with a project rendering based on an early design concept. The redevelopment of the Cambridge Center North Garage (Phase 1A) consists of construction of two commercial office towers with some innovation space and ground-floor retail totaling approximately 590,000 gross square feet on top of the existing garage structure with new lobby space that will extend to Broadway.

A new enclosed public open space, or winter garden, is proposed to replace the existing public park. Figure 1.2 shows the proposed winter garden proposed for the entry plaza of the Cambridge Center North Garage Office Buildings.

Eleven Cambridge Center Residential Building

Figure 1.3 presents the proposed Eleven Cambridge Center Residential Building massing and project rendering based on an early design concept. This Project Component (Phase 1B) consists of a new 22-story residential building with up to 294 units and 25,000 square feet of ground-floor retail to be constructed in place of the existing 3-story commercial office building totaling approximately 158,400 gross square feet of net new development.

Figure 1.4 illustrates the conceptual ground-level pedestrian circulation along Broadway and through the new buildings.

Three Cambridge Center Mixed Use Building

Figure 1.5 presents the proposed Three Cambridge Center Mixed Use Building with a project rendering based on an early design concept. The Three Cambridge Center Mixed Use Building consists of 19 stories with commercial office on the lower floors, up to 266 residential units on the upper floors, and approximately 20,000 square feet of retail space at the ground level. This new building will replace the existing 105,100-gross square foot commercial office building resulting in a total of approximately 211,100 gross square feet of net new development.

Other New Development

As shown in Figure 1.6, the Project also includes projects from Other Developers, including an approximately 60,000-gross square foot commercial office addition at the Whitehead Institute at Nine Cambridge Center located at the corner of Main Street and Galileo Galilei Way. Also, the Broad Institute proposes to convert approximately 15,100 square feet of mechanical space at their existing facility located at 75 Ames Street into commercial office space. Collectively, these Project Components will result in approximately 75,100 gross square feet of net new development.

Parking

Up to approximately 740 parking spaces are proposed to be completed as part of Phase 1 in order to support the new commercial and residential development proposed as part of the Project Change. New parking will be created in a combination of ways, including by adding an additional level to the Cambridge Center North

Garage and in a separate, new below-grade facility to be located under the new Eleven Cambridge Center Residential Building.

Public and Open Space Improvements

The Project includes enhancements to the public open space within the KSURP area, as shown in Figures 1.2 and 1.4. Within the KSURP area there are many opportunities to study open space improvement projects including, but not limited to the following considerations:

- Construction of a Winter Garden at the Cambridge Center North Garage that will provide for an activated, public and climate-controlled open space available for year round use (Figure 1.2).
- Improvements to the Sixth Street Connector, including new hardscapes, seating, lighting and accessibility for food trucks.
- Increased pedestrian permeability between buildings by enhancing pathway qualities and features (Figure 1.4).
- Construction of a mid-lock pedestrian crosswalk at the Cambridge Center North Garage (Figure 1.4).
- Incorporation of bike paths, routes and infrastructure throughout the KSURP area, including creation of the Grand Junction Mulit-Use Path within the MXD District.
- Improvements to pedestrian walkways along service roads on both sides of the Cambridge Center North Garage to promote permeability.
- Virtually concealing the Cambridge Center North Garage by architecturally enclosing the garage with a new structure.

Project Phasing and Schedule

The proposed approximately 15,100-square foot Broad Institute mechanical space conversion is expected to begin shortly after approval of Plan Amendment No. 10, which is anticipated to happen by the end of 2015nd zoning were approved in 2016. The Whitehead Institute Office Addition is also likely to begin construction in 2017 and is likely to be completed within 12-15 months.

The Project will be constructed in two key phases where Phase 1 will be split into two sub-phases. Phase 1A will consist of the redevelopment of the Cambridge Center North Garage with new commercial office/innovation space over the existing garage. Phase 1B will include demolition of the existing Eleven Cambridge Center commercial office building and construction of a new 294-unit residential with ground-floor retail space and below-grade parking. Phase 2 will include demolition of the existing Three

Cambridge Center commercial office building and construction of a new mixed use building with commercial office space, ground-floor retail space, and 320 residential units.

Regulatory Controls, Approvals, and Permits

Table 1-2 below lists the anticipated permits and approvals required for the Project. This section also summarizes state and local outreach completed prior to this filing.

Table 1-2 Updated List of Anticipated Permits and Approvals

Agency/Department	Permit/Approval/Action	Status
Commonwealth of Massachusetts[1]		
Massachusetts Department of Housing & Community Development	Urban Renewal Plan Amendment Approval	To be obtained
Executive Office of Energy and Environmental Affairs	Certificate Evidencing Completion of MEPA Review	Notice of Project Change submitted herein
Massachusetts Department of Transportation	Approval of Transportation Scope Letter	December 4, 2014
	Amended Section 61 Finding	To be issued (if required)
Massachusetts Department of Environmental Protection, Division of Air Quality Control	Air Quality Permit (under 310 CMR 7.00) for heating boilers and emergency generators	To be obtained (if required)
Massachusetts Department of Environmental Protection	Compliance with Massachusetts Contingency Plan	To be completed
City of Cambridge		
Cambridge Redevelopment Authority	Urban Renewal Plan Amendment Approval	Draft under review by the Board
Cambridge City Council	Urban Renewal Plan Amendment Approval	To be obtained
Cambridge Planning Board	Article 19 Special Permit Project Review Approval	To be obtained for each Project Component over 50,000 square feet

Major Plan Amendment Approval

According to M.G.L. Chapter 121B, a URP may be amended by a redevelopment authority after a duly noticed public meeting. Such an amendment may be deemed as either a Minor or Major Plan Amendment by DHCD. A Minor Amendment is one that includes no changes to the basic element s of the plan. Conversely, a Major Amendment involves significant changes to the core elements of the URP. The proposed Plan Amendment No. 10 of the KSURP is a Major Plan Amendment.

The CRA Board has discussed the proposed Plan Amendment No. 10 at multiple Board meetings over the past year. If approved by the CRA Board, a Major Plan Amendment must then be considered at a noticed public hearing and receive a recommendation from the Planning Board, and then finally be approved by the Cambridge City Council. The Proponent anticipates this approval will occur in late

2015. Following Cambridge City Council approval, the Plan Amendment is then forwarded to DHCD. The DHCD has up to 60 days to make a determination on the approval.

Agency Coordination and Public Outreach

Massachusetts Department of Transportation

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation projected to result from the Project. On March 4, 2015, the Proponent engaged in preliminary discussions with the Massachusetts Department of Transportation (MassDOT) and MBTA to discuss the Project, its impacts, and potential transportation mitigation and enhancements in the Kendall Square area. A range of issues were identified and, as described more fully in Chapter 2, *Transportation and Parking*, potential improvement opportunities are being considered as a program of elements to be developed in conjunction with the many stakeholders engaged in transportation planning and operations in Kendall Square, including the Kendall Square Mobility Task Force, the MBTA, and MassDOT. The proposed Enhanced Transit Mitigation Program (the "ETMP") would supplement the transportation mitigation measures outlined herein. The ETMP would be designed to enhance transit access to and mobility around Kendall Square, which the Proponent believes is critical to the long-term economic success of the area. Over the coming months, the Proponent will work closely with the City, the MBTA, and MassDOT to develop and refine the ETMP proposal, including additional details on the potential source of these funds and the range of transit mitigation projects and program options for consideration.

Public Outreach

The Project is the implementation of the Kendall Square Plan (the "K2 Plan"), which included an extensive 3-year public planning process (described further in the next section). The CRA currently utilizes a project website via coUrbanize in order to inform and engage Kendall Square residents, employees, visitors, and business owners in the process of permitting new development proposed through updates to the KSURP.[1]

The Proponent has held the following public meetings on the Project:

[1] http://courbanize.com/kendall-sq-urban-renewal/

- July 23, 2014 CRA Board Meeting – Discussion of the CRA process to initiate Plan Amendment No. 10 and MXD Zoning Revisions based on the K2 Plan recommendations.
- October 15, 2014 - Discussion regarding the existing Section 102: Urban Renewal Plan Objectives of the KSURP.
- November 19, 2014 - An informational slide presentation regarding Boston Properties' initial urban design concepts for the proposed future redevelopment (the Project Components). Discussion on the Project and MEPA review process also occurred during the full Board Meeting.
- January 15, 2015 - Informational slide presentation regarding Boston Properties' initial urban design concepts for future development phases on Parcels 2 and 4 within the KSURP area.
- February 25, 2015 – A preliminary draft of the proposed Plan Amendment No. 10 was issued.
- March 12, 2015 Public Forum - discussed the Project, including a presentation and discussion of the potential next phase of commercial and housing development within the MXD portion of the KSURP area.
- March 18, 2015 – A revised draft of the proposed Plan Amendment No. 10 was reviewed.

Project Consistency

The following describes how the Project is consistent with local, regional and/or state plans or policies.

Kendall Square Urban Renewal Plan

As described previously in the *Notice of Project Change Form Narrative/Project Summary*, the KSURP was originally adopted in 1965, amended in 1977 to create the Cambridge Center MXD District, and has undergone numerous Plan Amendments since the early 1980s. The Proponent has regularly consulted with the MEPA office on the Plan Amendments and included a complete and updated analysis of project impacts with a particular focus on analyzing the impact of changes on projected traffic impacts in the KSURP area.

The overall purpose of the KSURP was to eliminate blighted conditions of Kendall Square and to encourage redevelopment of the area through well-planned, well-designed improvements that provide the most appropriate reuse of the land for the City. Originally, the plan designated the majority of the KSURP area for public (government) use specifically for NASA where the remainder of the area would allow uses permitted under the Business B District of the Zoning Ordinance. However,

NASA withdrew from the KSURP, which resulted in a re-planning effort (Plan Amendment No. 1). This change permitted light industrial uses on Parcel 2 and an expansion of mixed use private development on Parcels 3 and 4.

In addition to eliminating the blighted conditions, the KSURP also had a number of other objectives, including:

- Maximize job opportunities;
- Improve land use and traffic circulation;
- Capitalize on and improve public transportation, utilities, and other public improvements;
- Create a livable, pleasant environment involving a mixture of land uses;
- Continue to establish a sense of place for Kendall Square; and
- Promote economic development that increases the City's tax base without significantly impacting the environment.

While the KSURP area is no longer blighted, the Project is consistent with these original objectives.

K2 Plan

The K2 Plan, published December 2013, was the result of an extensive community-based planning and design process. The K2 Plan created an opportunity to perform a comprehensive analysis of issues and opportunities that included sections on land use, environment and stormwater, transportation, and infrastructure among others. The analysis addressed Transit-Oriented Development (TOD) density, fostering a mix of land uses to meet the multiple needs of people who live within walking or biking distance, and enhanced TDM measures to discourage driving and encourage sustainable modes of transportation. It also emphasized the economic development benefits of focusing on sustainability: "Businesses are competing to attract the best and brightest talent to their companies and demonstrating leadership as a sustainable, cost-efficient place to do business could connect environmental and economic sustainability of Kendall Square."[2] As a good example of a TOD project that concentrates density close to public transit and other infrastructure for alternative modes of transportation (i.e., walking, biking), the Project achieves the objectives of the K2 Plan.

The K2 Plan also created a vision for Kendall Square with goals and objectives, or recommendations, to work implement for future growth. In summary, zoning- and urban design-related recommendations include to:

[2] Cambridge Community Development Department, Kendall Square Final Report 2013, page 40.

- Goal # 1 - Nurture Kendall's Innovation Culture;
- Goal #2 - Create Great Places;
- Goal #3 - Promote Environmental Sustainability; and
- Goal # 4 - Mix Living, Working and Playing.

The Project supports these K2 Plan recommendations by expanding opportunities for Kendall Square to grow while enhancing the public realm and incorporating sustainable design and operation elements to further reduce the potential environmental impacts typically associated with new development.

Specifically, as part of Goal #4, the K2 Plan calls for "a well-balanced land use concept." The key goal is to increase housing and ground floor retail in order to create a true mixed use community. The Project is consistent with this goal in that it provides the opportunity for over 500 new residential units and ground floor retail through all Project Components.

Metropolitan Area Planning Council

Cambridge is located within the Metropolitan Area Planning Council (MAPC) planning area. In 2008, MAPC adopted its *MetroFuture: Making a Greater Boston Region* plan for collaborative approach to develop a regional plan that addresses the challenges and opportunities metropolitan Boston faces over the next planning horizon to 2030. MetroFuture includes detailed goals for development and preservation, and specific strategies to equitably distribute the benefits and burdens of growth. A key goal of MetroFuture is to focus growth where infrastructure already exists, including public transit in order to preserve natural resources. Other goals include the following:

- **Sustainable Growth Patterns**: Population and job growth will be focused in developed areas already well-served by infrastructure.
- **Housing Choices:** A diverse array of housing choices will meet the needs of the region's residents.
- **Healthy Communities:** Residents will be safe, healthy, well-educated, and engaged in their community.
- **Regional Prosperity:** A globally-competitive regional economy will provide opportunity for all the region's workers.
- **Transportation Choices:** An efficient transportation system will offer more choices and make it easier to get around.
- **Healthy Environment:** Natural resources will be protected thanks to a strong "environmental ethic."

The Project accomplishes many of the smart growth principles recommended by MAPC, including:

- Redevelopment of an urban site with existing infrastructure, including public transit;
- Partial re-use of an existing parking garage and reduced site disturbance;
- Creation of new housing opportunities, including affordable housing options;
- Creation of new employment opportunities;
- Implementation of a robust TDM plan to reduce single-occupancy vehicles by encouraging new transportation choices, such as car and bicycle sharing; and
- Incorporation of sustainable/green building features, including energy and water efficient building systems; thereby, reducing the Project's impacts on the environment.

While the KSURP has been successful in eliminating blighted conditions, the Project will continue to meet many of economic development goals and objectives of the KSURP. Such goals and objectives are generally in line with MetroFuture, including focusing new development in city and town centers, near transit and infrastructure, and preserving both environmental and financial resources that would be lost to sprawling, low density development. The Project will help meet these goals in part by developing sustainable buildings and enhancing the pedestrian environment while taking advantage of nearby existing public transportation.

Governor's Clean Energy and Climate Plan

The Global Warming Solutions Act of 2008 requires the Secretary of Energy and Environmental Affairs (EEA) to establish a statewide limit on GHG emissions of between 10 percent and 25 percent below 1990 levels for 2020 - on the way toward an 80 percent reduction in emissions by 2050 - along with a plan to achieve the 2020 target. In 2010, the EEA Secretary issued the state-wide Clean Energy and Climate Plan for 2020, which contains the measures necessary to meet these limits. A key goal of the plan is to assist and encourage businesses, households, municipalities, and institutions to better manage their energy needs by incorporating renewable and alternative sources of energy. The Project supports the state's Clean Energy and Climate plan by incorporating on-site alternative and renewable energy sources to reduce the Project's dependence on fossil fuels, including EV charging stations in the parking garages and rooftop solar panel systems (if deemed financially feasible upon further evaluation through project design).

Executive Order 385 – Planning for Growth

Generally, Executive Order 385 (EO 385) aims "…to actively promote sustainable economic development practices by advocating for state activities that are supported by adequate infrastructure and that are designed in such a way so that they do not adversely impact the natural environment." The Project is consistent with EO 385 because its design aims to redevelop a previously developed urban site with existing and adequate infrastructure, including public transit; therefore, reducing environmental impacts, such as traffic, new impervious surface, and new land alteration. The Project will improve water quality through proposed modifications/upgrades to the stormwater management system and incorporate measures for groundwater recharge. The Project aims to create a mix of activity and provides for new employment and diverse housing opportunities, including the creation of approximately 2,650 construction jobs in all trades over the estimated 10-year construction period and over 2,600 new transit-accessible employment opportunities as well as over 500 new housing units 15 percent of which will be affordable units—all of which will support the local and state economy. Furthermore, as demonstrated in this NPC, the Proponent will minimize any unavoidable environmental impacts through the implementation of mitigation measures, to the extent feasible.

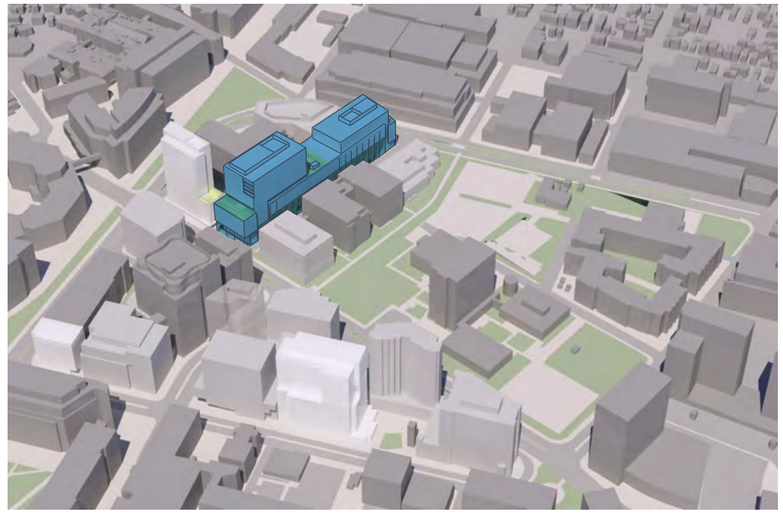
Commonwealth's Sustainable Development Principles

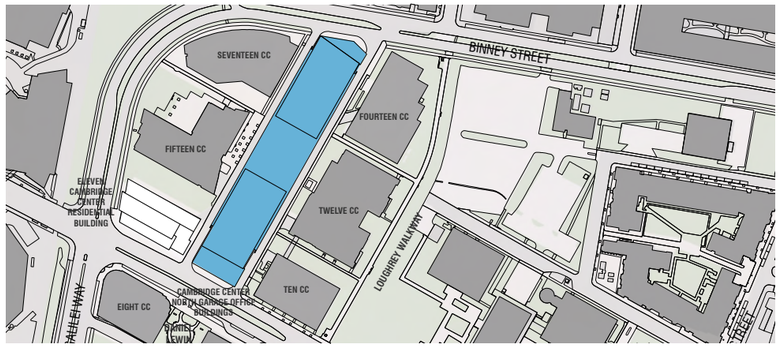
The Project is consistent with several of the Office of Commonwealth Development's Sustainable Development Principles. The following lists the specific smart growth principles that the Project is generally consistent with.

- **Concentrate Development and Mix Uses.** The Project consists of redevelopment of an underutilized urban site with existing/adequate infrastructure and promotes a vibrant mixed-use development that will re-use part of the existing building.
- **Make Efficient Decisions.** A key goal of the Project is to re-use the existing Cambridge Center North Garage in order to limit construction new structures. The Project also introduces new pedestrian-friendly and transit-accessible employment and housing opportunities; thus, reducing traffic.
- **Protect Land and Ecosystems.** The Project protects land and ecosystems by redeveloping a previously disturbed/developed area in place of a 'greenfield' outside of Cambridge.
- **Use Natural Resources Wisely**. The Project promotes sustainable planning and design elements, including energy and water efficient building systems and operations, reduced construction and operational waste, and environmentally-preferable materials.

- **Expand Housing Opportunities.** The Project will expand housing opportunities, including affordable housing units in the Kendall Square neighborhood, which currently has little housing.
- **Provide Transportation Choices.** The Project is an example of a TOD development with direct access to various forms of public transit. In addition, transportation choices will be expanded for residents and visitors. Pedestrian and bicycle access and circulation will be enhanced as part of the Project.
- **Increase Job and Business Opportunities.** The Project provides for new employment opportunities (thousands of construction jobs in all trades and new transit-accessible permanent part-time and full-time jobs).
- **Promote Clean Energy.** Electric Vehicle (EV) charging stations and preferred parking for low-emitting/fuel-efficient/alternative fuel vehicles will be incorporated into the parking garages. In addition, consistent with the Proponent's sustainability goals, the incorporation of rooftop solar panels will be evaluated throughout project design.
- **Plan Regionally.** The Project was developed taking into consideration regional context, access, market area, and economics, and is consistent with the goals of the MAPC's MetroFuture plan for the Boston-Cambridge Metro region, as discussed above.

Broadway Street Perspective View





Existing Site Photo

Source: Sasaki Associates

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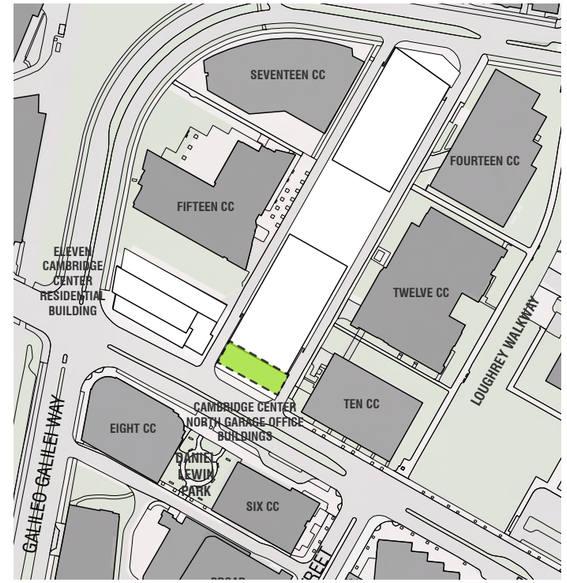
Figure 1.1
Proposed Conditions with Rendering
Cambridge Center North Garage Office Buildings

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



Location of Winter Garden at Street level

Cross Section of Broadway

Source: Sasaki Associates

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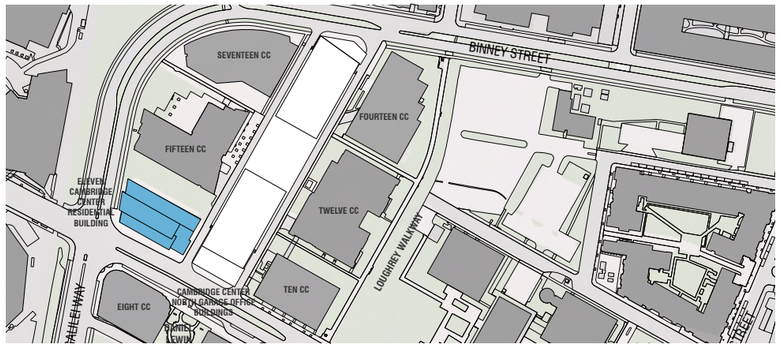
Figure 1.2
Proposed Winter Garden (Looking East)
Cambridge Center North Garage Office Buildings

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Broadway Street Perspective View



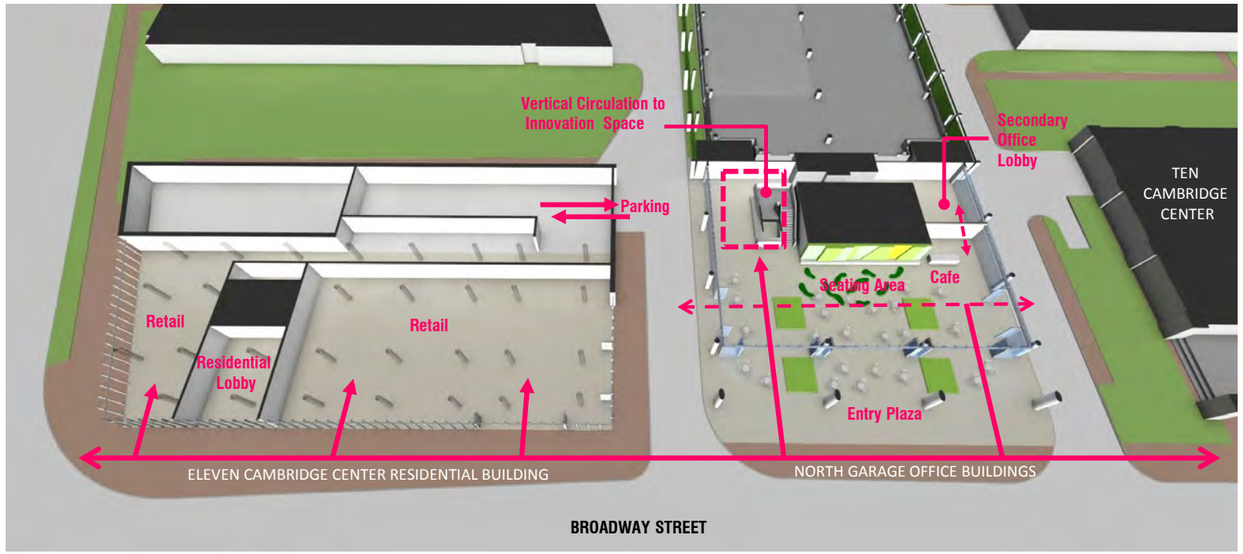
Existing Site Photo

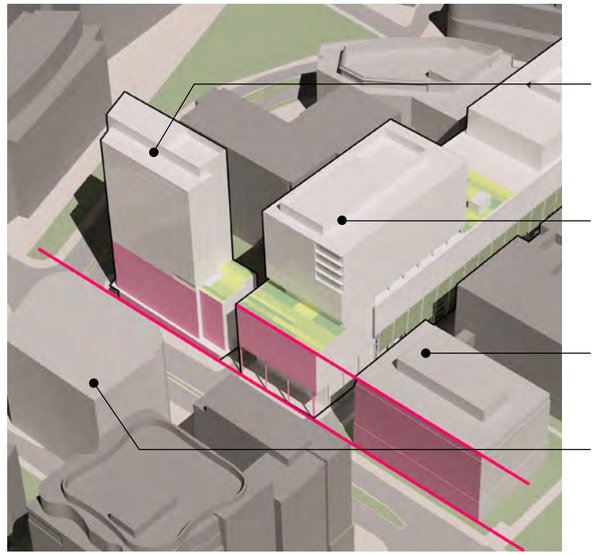
Source: Sasaki Associates

CRA

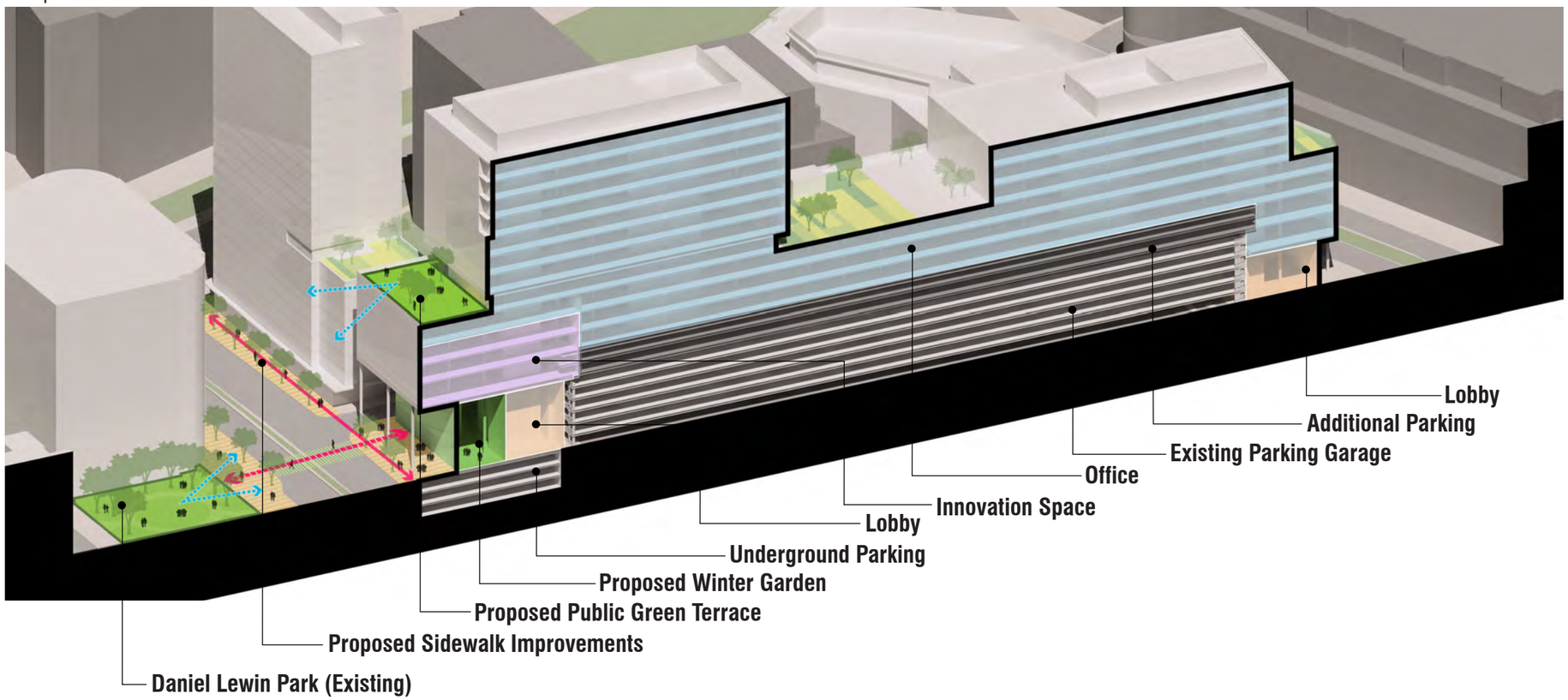
Figure 1.3
Proposed Conditions with Rendering
Eleven Cambridge Center Residential Building

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA





Proposed Ground Level Circulation



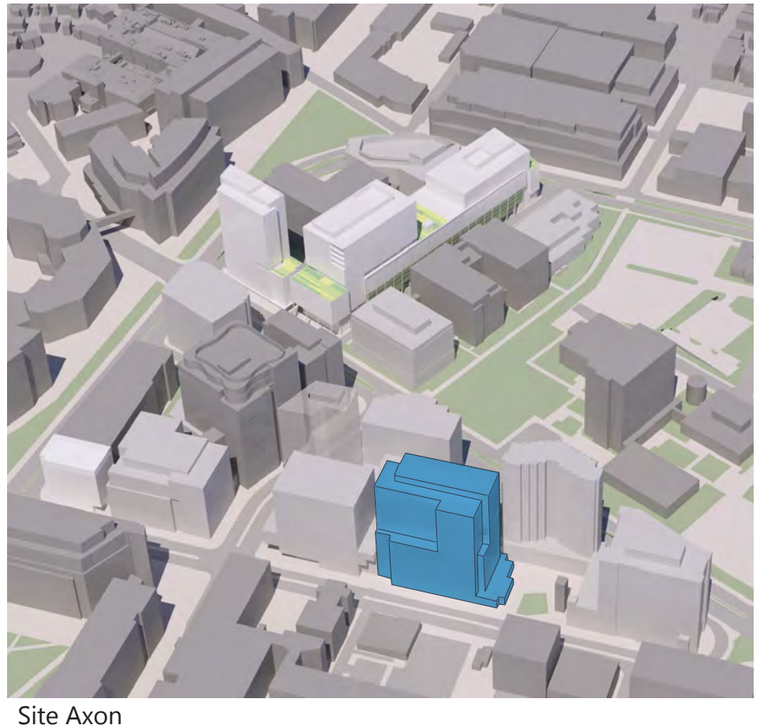
Source: Sasaki Associates

CRA

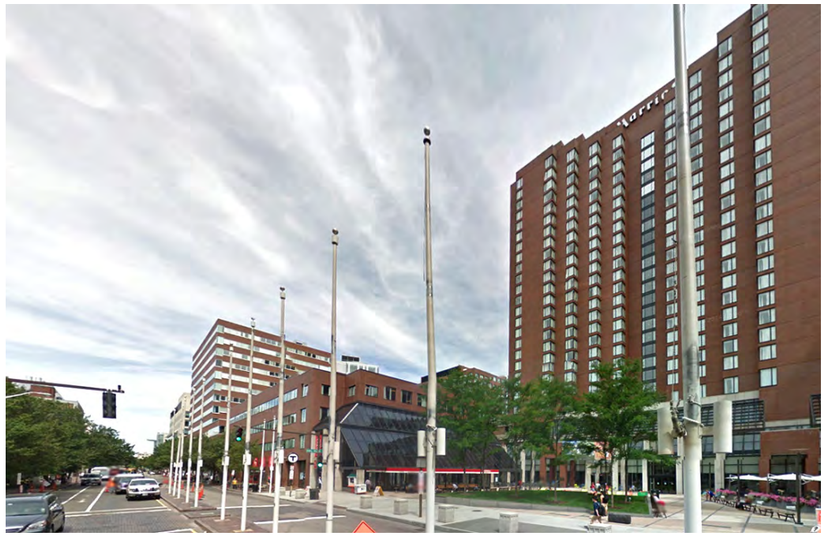
Figure 1.4
Proposed Circulation - Cambridge Center North Garage Office Buildings & Eleven Cambridge Center Residential Building

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

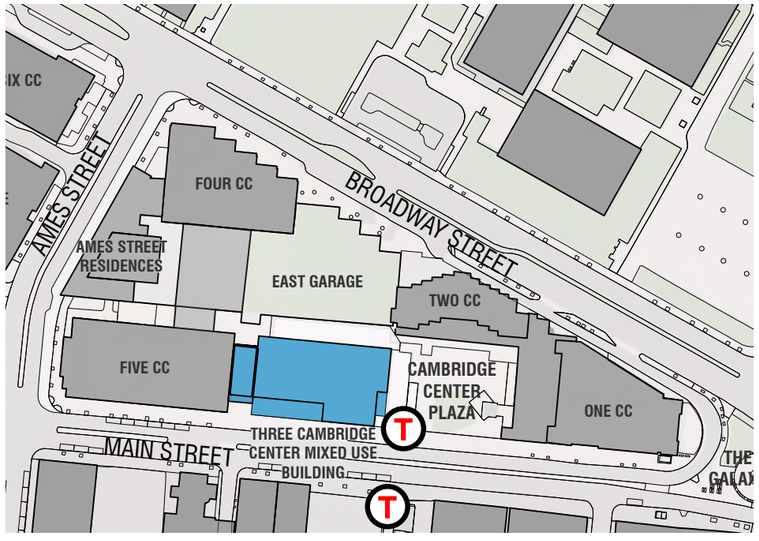
Massing Concept (Looking from Main Street)



Site Axon



Existing Site Photo



Proposed Site Plan

Source: Sasaki Associates

CRA

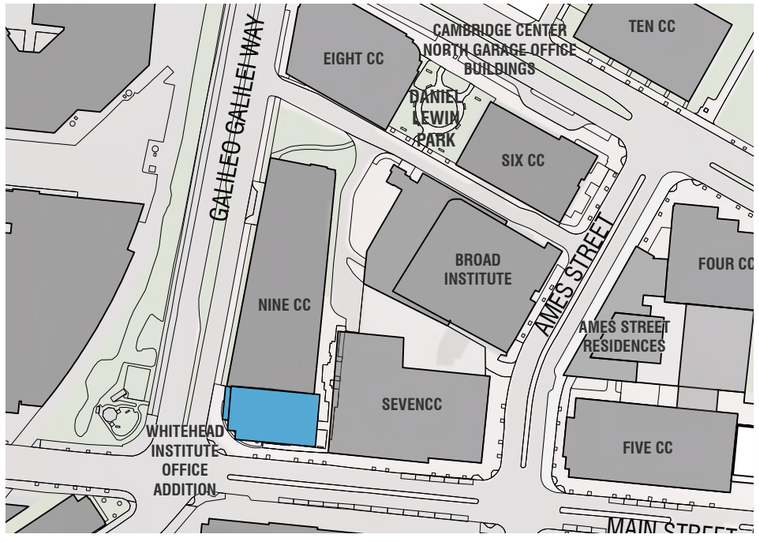
Figure 1.5
Proposed Conditions with Rendering
Three Cambridge Center Mixed Use Building

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Perspective View from Main Street

Site Axon

Existing Site Photo



Proposed Site Plan

Source: Sasaki Associates *Tsoi / Kobus & Associates

CRA

Figure 1.6
Proposed Conditions with Rendering
Whitehead Institute Office Addition

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

2

Transportation and Parking

Introduction

This chapter presents a summary of the evaluation of the transportation and parking aspects of the Project, as described in detail in Chapter 1, *Project Change Description* and illustrated on Figures 1.1 through 1.6. Specifically, this evaluation includes the following elements:

- Definition and presentation of existing traffic, including roadway capacities, parking, transit, pedestrian and bicycle circulation, loading and overall Project site conditions.
- An evaluation of the Project's long-term impacts of traffic, including roadway capacities, parking transit, pedestrian and bicycle circulation, loading and overall KSURP area conditions.
- A detailed summary of the proposed transportation mitigation and improvements the development will contribute to the KSURP area to help reduce the transportation impacts and improve overall accessibility to and from the area.

Additional detail and supporting information is provided in Appendix C of this NPC, which is provided electronically on the enclosed CD-ROM due to size. Hardcopies of any or all of these supporting materials are available upon request.

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation projected to result from the Project. The Proponent has engaged in preliminary discussions with MassDOT and MBTA representatives to discuss the Project, its impacts, and potential transportation mitigation and enhancements in the KSURP area. The Proponent has also begun to coordinate with the City's Traffic, Parking and Transportation (TP&T) Department to address additional requests from the City regarding traffic conditions analysis in Kendall Square and potential Project-related impacts to the local transportation infrastructure. Through the MEPA process, the Proponent will continue to coordinate

closely with both the City, MassDOT and MBTA to begin to address any comments and understand possible additional information needs.

The information and analysis provided in this chapter responds to the TSL dated December 4, 2014 from MassDOT in response to VHB's Request for Scoping letter dated November 18, 2014. A copy of MassDOT's scoping letter is included in Appendix C of this NPC. In developing the Request for Scoping letter, the Proponent engaged TP&T to provide guidance on the methodology used to analyze existing and future conditions including trip generation, mode split, trip distribution and trip assignment. The 'Project Description' section below describes the area and proposed development analyzed in this chapter.

Project Description

The Project consists of approximately 1,034,600 square feet of new development to the previously permitted KSURP area increasing the maximum build out to approximately 4.3 million gross square feet of space. Originally adopted in 1965, the KSURP was developed to reenergize and revitalize the Kendall Square area of Cambridge. The Kendall Square Urban Renewal Project area is bounded by Main Street, the Grand Junction Railroad, Binney Street and Third Street. Together through the effort of the City, Proponent and private developers (the Redeveloper and Other Developers), the Kendall Square area has grown from an industrial district to a thriving innovative community.

In 2013, the CDD published the K2 Plan to explore future development opportunities in the Kendall Square area. Part of the planning study focuses on the MXD District which encompasses the proposed Project parcels that are proposed to be developed by Boston Properties. The K2 Plan study recommended increasing the allowable zoned development square footage to approximately four million square feet.

The Project will be located within Parcels 2, 3 and 4 of the KSURP area with development proposed for sites currently known as the Cambridge Center North Garage, Eleven Cambridge Center, Three Cambridge Center, the Whitehead Institute (Nine Cambridge Center) and the Broad Institute (75 Ames Street), as previously shown in Figure S.2. The Project Components, which are consistent with the K2 Plan zoning recommendations, are summarized in Table 2-1 below and described further in Chapter 1, *Project Change Description*.

The Project will be supported by approximately 740 new parking spaces, which would be added to the Cambridge Center North Garage as well as in a separate, new below-grade facility to be located under Eleven Cambridge Center. The additional parking will be operated as shared parking, serving office uses primarily during weekdays and residential uses overnight and on weekends. The Project will also provide approximately 800 covered and secured bicycle parking spaces and approximately 100 short-term external bicycle parking spaces in conformance with City's Bicycle Guidelines. These spaces will be distributed between the Cambridge

Center North Garage, West Garage and East Garage as well as a new garage under Eleven Cambridge Center.

Table 2-1 Proposed Development Program

Project Component	Size/Quantity
Phase 1A – Cambridge Center North Garage Office Buildings	
Commercial Office	546,000 GSF
Innovation Space	39,000 GSF
Retail	5,000 GSF
NET NEW Phase 1A	*590,000 GSF*
Phase 1B – Eleven Cambridge Center Residential Building	
Existing Eleven Cambridge Center Commercial Office (to be demolished)	(76,600 GSF)
Residential	210,000 GSF (294 units)
Retail	25,000 GSF
NET NEW Phase 1B	*158,400 GSF*
TOTAL NET NEW Phase 1	*748,400 GSF*
	740 parking spaces
Phase 2 – Three Cambridge Center Mixed Use Building	
Existing Three Cambridge Center Commercial Office (to be demolished)	(105,100 GSF)
Residential	190,000 GSF (266 units)
Commercial	106,200 GSF
Retail	20,000 GSF
TOTAL NET NEW Phase 2	*211,100 GSF*
Other Development	
Whitehead Institute Addition[1]	60,000 GSF
Broad Institute Office Conversion[2]	15,100 GSF
TOTAL NET NEW Other Development	*75,100 GSF*
TOTAL (NET NEW)	**1,034,600 GSF**
	584,600 GSF Office[3]
	50,000 GSF Retail
	400,00 GSF Residential (560 units)
	740 spaces

GSF Gross Square Feet
1 To the existing facility at Nine Cambridge Center.
2 Accounts for the conversion of existing mechanical space to be re-purposed/fit-out into leasable commercial office space at 75 Ames Street.
3 Includes Innovation Space.

Summary of Project Change Impacts

Traffic operations within the KSURP area have been monitored by FST since their initial traffic analysis for Plan Amendment No. 3 for which the MEPA approval required the Proponent to annually update the KSURP traffic counts, collect and analyze parking data, and review KSURP tenant surveys. FST has been reporting on area traffic volumes and parking garage usage since the approval of Plan Amendment No. 3 in 1993. Through the annual reporting and analysis process, many favorable transportation trends and observations have been documented, particularly relating to project trip generation rates.

The history of the KSURP with the MEPA process, as documented by the FST analysis, has consistently shown that actual trip generation in Kendall Square is significantly lower than accepted methodology for average daily vehicle trip (ADVT) projections, as shown in Figure 2.1. Obtaining accurate projections requires substantial downward adjustment from standard Institute of Transportation (ITE) Trip Generation Manual rates. This is due to the high proportion of alternative modes, including transit, walk and bike, by commuters, shoppers, visitors, and residents in Kendall Square. Traffic analyses submitted with KSURP Plan Amendment No. 3 and No. 8 in particular demonstrate this important conclusion.

FST summarized the traffic impact of Amendment No. 3 in a July 9, 1993 letter to then CRA Executive Director Joseph F. Tulimeri. FST conducted traffic counts and consulted parking surveys conducted by Kinney Systems, as well as employee commuting surveys from a large Kendall Square employer. FST explained that it employed a two-step method for projecting trip generation, as recommended by the ITE Trip Generation Handbook. First, FST used ITE rates to estimate daily trip generation, based on land use categories. Second, FST adjusted the ITE rates to account for local conditions, including the presence of mass transit, City and State laws and regulations affecting trip generation, and the various traffic count and parking data. These data together suggested that transit, carpool, and walking transit modes would account for approximately 32 percent of trips in Kendall Square. After applying the adjustment, FST projected that a full build out under Amendment No. 3 would generate no more than 13,700 vehicle trips per day, approximately 29 percent less than the 19,300 vehicle trips per day analyzed in the 1977 FEIR.

As required under the MEPA approval for Plan Amendment No. 3, FST has collected data on trends in land uses, updated traffic counts, collected and analyzed parking data, and reviewed tenant surveys on an annual basis since 1994. FST summarized its findings in a June 15, 2010 letter to the CRA, in connection with proposed Amendment No. 8. The historical record formed by data collection between 1994 and 2010 provided a "firm basis upon which to estimate future traffic impacts in the Area at full build out [as described in the 1977 FEIR and amended to a total of 3.3 million square feet]" and to conclude that overall trip generation under Amendment No. 8 would be lower than under Amendment No. 7 and substantially lower than estimated

in the 1977 FEIR. Historically, trip generation counts suggested that actual trip generation "average[ed] 14 to 15 percent lower than projected trip generation."

In 2010, FST updated its projection methodology to take into account historical traffic measurements and the excellent transit services and favorable mode split in Kendall Square. Specifically, FST assumed a 43 percent adjustment downward from ITE rates, consistent with values from the 1994-2010 data. FST noted the 43 percent adjustment was actually conservative, as count data suggested that actual trip generation was more than 50 percent below unadjusted ITE rates.

Favorable mode split accounted for much of the adjustment. FST noted in particular that the 2009 tenant survey indicated that transit, walk-bike, shuttle, and carpool accounted for more than 70 percent of trip-making in Kendall Square. On that basis, FST concluded that maximum build out under Amendment No. 8 would generate approximately 13,714 vehicle trips per day, 28 to 30 percent fewer trips than estimated under the Preferred Plan in the FEIR. FST specifically noted that "[b]ecause of the excellent public transportation services, and newly installed bicycle circulation facilities, the extensive sidewalk system in the Area, and the City's Trip Reduction Ordinance, the Area continues to generate vehicle trips at rates far lower than those contained in the ITE Trip Generation Report."

The conclusions summarized in the FST reports can be used to help forecast the trips generated by proposed Amendment No. 10. The traffic produced by the proposed Project will increase traffic within the area, but at a rate lower than the reported ITE estimates. The analysis presented in the following sections provides a conservative approach to the trip generation methodology.

ITE unadjusted trip rates estimate that the Project will generate approximately 10,512 vehicle trips to the KSURP area. As FST has shown, this estimation is very high for the KSURP area and adjustments, making use of area-specific mode splits and vehicle occupancy rates, help to more accurately represent the actual number of vehicle trips generated by the Project. Taking these factors into consideration the Project will generate an estimated 3,638 adjusted vehicle trips. Adding this expected future traffic to the 13,714 average vehicle trips per day, as projected by FST under Amendment No. 8, the estimated total number of vehicle trips per day to the KSURP area is calculated to total 17,352, which is still approximately 10 percent less the projected 19,300 vehicle trips estimated in the 1977 FEIR.

Collectively, the actual approximately 2,667 existing off-street parking spaces with the proposed 740 new off-street parking spaces falls within the maximum off-street parking supply previously approved under Plan Amendment No. 3 (3,545 spaces).

Existing Transportation Conditions

This section provides a summary of existing transportation conditions in the KSURP area. Discussions include the following:

- Existing area roadways and intersections;
- Pedestrian and bicycle activity and amenities;
- Public transportation options;
- Study area crash analysis;
- Nearby parking supply and regulations; and
- Existing loading activities and deliveries.

Study Area

Roadway Network

The Project Components are located within Parcels 2, 3 and 4 of the KSURP area, specifically at: the Cambridge Center North Garage; Eleven Cambridge Center; Three Cambridge Center; Nine Cambridge Center (Whitehead); and 75 Ames Street (Broad Institute), as previously shown in Figure S.2**.** The KSURP area is generally bounded by Binney Street to the north, Third Street to the east, Main Street to the south and Galileo Galilei Way to the west.

Binney Street is a four-lane divided roadway running east-west from Edwin H Land Boulevard along the Charles River Basin to the east to Galileo Galilei Way where it becomes a two-lane roadway to Cardinal Medeiros Avenue west of the Project area. Third Street runs north-south connecting Monsignor O'Brien Highway to Broadway near Kendall Square MBTA Station. Main Street is a two-lane roadway running east-west from the Longfellow Bridge to Massachusetts Avenue. Galileo Galilei Way runs north-south along the west side of the Project Site, providing two-lanes in each direction between Binney Street and Main Street. Broadway runs diagonal through the KSURP area providing a major connection between Cambridge Center/Kendall Square and Harvard Square.

Study Intersections

The study area includes twenty-four (24) key intersections, as illustrated in Figure 2.2 and described below.

1. O'Brien Highway/Third Street *(Signalized)*
2. Cambridge Street/Third Street *(Signalized)*

3. Cambridge Street/First Street *(Signalized)*
4. O'Brien Highway/Cambridge Street/East Street *(Signalized)*
5. O'Brien Highway/Land Boulevard/Charlestown Avenue *(Signalized)*
6. Binney Street/Galileo Galilei Way/Fulkerson Street *(Signalized)*
7. Binney Street/North Garage West Driveway *(Unsignalized)*
8. Binney Street/North Garage East Driveway *(Unsignalized)*
9. Binney Street/Third Street *(Signalized)*
10. Binney Street/First Street *(Signalized)*
11. Binney Street/Land Boulevard *(Signalized)*
12. Broadway/Galileo Galilei Way *(Signalized)*
13. Broadway/North Garage West Driveway *(Unsignalized)*
14. Broadway/North Garage East Driveway *(Unsignalized)*
15. Broadway/Ames Street *(Signalized)*
16. Broadway/Third Street *(Signalized)*
17. Broadway/Main Street *(Unsignalized)*
18. Broadway/Main Street/Memorial Drive *(Unsignalized)*
19. Main Street/Ames Street *(Signalized)*
20. Main Street/Galileo Galilei Way/Vassar Street *(Signalized)*
21. Massachusetts Avenue/Vassar Street *(Signalized)*
22. Memorial Drive/Route 3/Ames Street *(Unsignalized)*
23. Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps *(Signalized)*
24. Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps *(Signalized)*

O'Brien Highway/Third Street is a three leg signalized intersection located north of the proposed development. Third Street is two lanes in the northbound direction with a left turn only lane and a general purpose lane. O'Brien Highway is three lanes in the both directions divided by a raised, concrete median. The westbound approach is one left/thru lane and two thru lanes. The eastbound approach is two thru and one thru/right lanes. Crosswalks are located at the O'Brien Highway westbound leg and the Third Street leg of the intersection with wheelchair ramps.

Cambridge Street/Third Street is a four leg signalized intersection located to the north of the proposed development. Third Street northbound provides one general purpose lane while the southbound approach has two lanes with a left turn only lane and a thru/right lane. Cambridge Street provides a general purpose lane and a separate bike lane in both the westbound and eastbound directions. Crosswalks are located at each leg of the intersection with wheelchair ramps at all corners. Parking is permitted on the east side of the Third Street northbound approach and both sides of Cambridge Street.

Cambridge Street/First Street is a four leg signalized intersection located to the northeast of the KSURP area. First Street northbound approach has two lanes: a left turn and a right turn at the intersection, with a separate bike lane. In the southbound direction, there is an MBTA bus driveway for the Lechmere Station. Cambridge Street westbound provides two lanes: a left turn land and a thru lane. The eastbound approach is one thru/right lane. There is a separate bike lane in both directions on

Cambridge Street. Crosswalks are located at each leg of the intersection with wheelchair ramps. Parking is permitted on both sides of the Cambridge Street to the west of the intersection.

O'Brien Highway/Cambridge Street/East Street is a four leg signalized intersection located northeast of the KSURP area. The eastbound Cambridge Street approach provides three lanes; one lane is left turn only onto East Street or O'Brien Highway and two are thru lanes that continue onto O'Brien Highway eastbound. East Street has a general purpose lane in the southbound direction with a separate bike lane. The O'Brien Highway north-westbound approach is four lanes, two left turn lanes, a thru lane, and a thru/right lane. The south-eastbound approach is five lanes with one left turn, three thru, and one right turn lane. Both legs of O'Brien Highway have concrete medians. The MBTA Lechmere Station has a driveway exit at the O'Brien Highway eastbound leg. Crosswalks with wheelchair ramps are located across both O'Brien Highway approaches and the East Street approach. Parking is prohibited along the intersection approaches.

O'Brien Highway/Land Boulevard/Charlestown Ave is a four leg signalized intersection located northeast of the KSURP area and the southeast of the O'Brien Highway/Cambridge Street/East Street intersection. The southeast approach on the O'Brien Highway provides a left turn only lane, a left/thru lane, two thru lanes, and a right turn only lane that is separated from the intersection with a median. The southwest approach on Charlestown Ave provides a left/thru lane and a thru/right lane. The northwest approach on the O'Brien Highway provides two left turn only lanes, two thru lanes, and a right turn only lane. The northeast approach on Land Boulevard provides a left turn only lane, two thru lanes, and a right turn only lane. Crosswalks are located at each leg of the intersection with wheelchair ramps. Parking is permitted along the intersection approaches.

Binney Street/Galileo Galilei Way/Fulkerson Street is a four leg signalized intersection located northwest of the proposed development. The Fulkerson Street southbound approach provides one bear right/right turn lane. Galileo Galilei Way is the southwest approach and provides two thru lanes onto Binney Street. The Binney Street northwest approach provides a right turn only lane and a bear left lane. Binney Street westbound approach provides two lanes, a thru and a thru/right lane. Crosswalks with wheelchair ramps are provided to cross all approaches. Parking around the intersection is limited to both sides of Fulkerson Street.

Binney Street/North Garage West Driveway is a three leg unsignalized intersection located north of the Cambridge Center North Garage. The northbound approach on the North Garage West Driveway provides a single lane designated as right turn only onto Binney Street eastbound. Vehicles are only allowed to turn right onto Binney Street because the North Garage West Driveway only intersects with the eastbound travel lanes. Binney Street eastbound and westbound both have two thru lanes with a grass median separation. Crosswalks with wheelchair ramps are located across the

North Garage West Driveway approach. Parking is prohibited along the intersection approaches.

Binney Street/North Garage East Driveway is a three leg unsignalized intersection located north of the Cambridge Center North Garage and east of the Binney Street/North Garage West Driveway intersection. The northbound approach on the North Garage East Driveway provides left/right turn lane onto Binney Street in either the eastbound or westbound direction. Binney Street, at this intersection, has a break in the grass median separation, and vehicles are allowed to turn. The eastbound Binney Street approach provides a thru lane and a thru/right turn lane. The westbound Binney Street approach provides a U-turn/left lane and two thru lanes. No striped crosswalks are provided at this intersection, but there are wheelchair ramps across the North Garage East Driveway. Parking is prohibited along the intersection approaches.

Binney Street/Third Street is a four leg signalized intersection located northeast of the proposed development. Third Street northbound provides one left/thru lane and one right turn only lane. The southbound direction is one general purpose lane. Binney Street provides three lanes, a left turn only, a thru, and a thru/right lane in both the east and westbound directions. Bike lanes are provide along all intersection approaches. Crosswalks are provided across each leg of the intersection with wheelchair ramps. Just east of the intersection, on the south side of Binney Street is an EZRide stop for the MIT Shuttle.

Binney Street/First Street is a four leg signalized intersection located northeast of the KSURP proposed development. First Street provides travel in the north-south direction. The southbound approach is two lanes, a left/thru and a right turn only lane, with a bike lane. First Street northbound approach is one general purpose lane. Binney Street is three lanes, a left turn only, a thru, and a thru/right lane, in the eastbound direction. The westbound Binney Street approach is two lanes, a thru and a thru/right lane. Bike lanes and crosswalks are located at each leg of the intersection.

Binney Street/Land Boulevard is a three leg signalized intersection located northeast of the proposed development. Binney Street eastbound provides a left turn only and a left/right turn lane. Land Boulevard northbound provides two left turn only lanes and three thru lanes. The southbound Land Boulevard approach provides two thru lanes and one right turn only lane. Crosswalks are located across each approach. No parking is allowed on any of the intersection approaches.

Broadway/Galileo Galilei Way is a four leg signalized intersection located at the western edge of the KSURP development area. Galileo Galilei Way southbound provides a left turn only lane, a thru lane, and a right turn only lane. The Galileo Galilei Way northbound approach provides a left turn lane, a thru lane, and a thru/right lane. Broadway south-eastbound provides a left turn only lane, a thru lane, and a right turn only lane. The Broadway north-westbound approach provides three lanes with a left turn only lane, a thru lane and a thru/right lane. All approaches

provide bike lanes. Crosswalks are located at each leg of the intersection with wheelchair ramps. Just west of the intersection on the south side of Broadway is an MBTA bus stop for Route 64, 68, and 85 and just east of the intersection on the both sides of Broadway is an EZRide stop. Parking is prohibited at the intersection.

Broadway/North Garage West Driveway is a three leg unsignalized intersection located south of the Cambridge Center North Garage. The southbound approach on the North Garage West Driveway provides a single lane designated as right turn only onto Broadway westbound. Exiting vehicles are only allowed to turn right onto Broadway because the North Garage West Driveway only intersects with the westbound travel lanes. Broadway westbound has a left turn only lane (for a different upcoming intersection) a thru lane and a thru/right lane with a grass median separation from the two eastbound thru lanes. Vehicles are allowed to turn right onto North Garage West Driveway form Broadway westbound. There are no striped crosswalks, but there is a sidewalk at grade that spans across the North Garage West Driveway approach. Parking is prohibited along the intersection approaches.

Broadway/North Garage East Driveway is a three leg unsignalized intersection located south of the Cambridge Center North Garage. The southbound approach on the North Garage East Driveway provides a single lane designated as right turn only onto Broadway westbound. Exiting vehicles are only allowed to turn right onto Broadway because the North Garage West Driveway only intersects with the westbound travel lanes. Broadway westbound has three thru lanes with a grass median separation from the two eastbound thru lanes. Vehicles are restricted from turning right onto North Garage East Driveway from Broadway westbound. There is a crosswalk with wheelchair ramps across the North Garage East Driveway. Parking is prohibited along the intersection approaches.

Broadway/Ames Street is a three leg signalized intersection located in the heart of the KSURP development area. Ames Street northbound provides a left turn only lane and a right turn only lane. Broadway runs southeast-northwest through the study area providing two lanes, a right turn only and a thru lane at the south-eastbound approach. The north-eastbound approach provides one left turn only lane and one thru lane. All approaches provide bike lanes and crosswalks. Parking is permitted on both sides of Ames Street near the intersection.

Broadway/Third Street is a three leg signalized intersection located adjacent to the proposed Three Cambridge Center Mixed Use Building. Third Street southbound provides a left turn only and a right turn only lane and a separated bike lane. The south-eastbound Broadway approach provides a left turn and two thru lanes with a channelized right lane onto Main Street. The north-westbound Broadway approach is a thru and thru/right lane with a bike lane. Crosswalks are located at each leg of the intersection with wheelchair ramps. Parking is permitted at the Broadway north-westbound approach and on the east sides of Third Street.

Broadway at Third Street intersection is currently under construction with the new configuration discussed and analyzed under No-Build and Build Conditions.

Broadway/Main Street is a two leg unsignalized intersection with stop control on the Main Street approach. Broadway provides two through lanes eastbound with a channelized right turn onto Main Street westbound prior to the Broadway/Third Street signalized intersection. Main Street is one-way with a stop controlled, right turn onto Broadway eastbound. Main Street eastbound provides a designated bike lane. Crosswalks with wheelchair ramps are located at the Main Street eastbound approach and the Broadway channelized turn onto Main Street westbound. There are no bus stops near the intersection. Parking is prohibited at the intersection.

Broadway/Main Street/Memorial Drive is two separate two leg, unsignalized intersections with stop control on both Memorial Drive on/off-ramp approaches. The north most intersection includes the Memorial Drive southbound on/off-ramp and the Broadway/Main Street westbound leg. The south most intersection includes the Memorial Drive northbound on/off-ramp and the Broadway/Main Street eastbound leg. The MBTA Red Line run in the middle of Broadway/Main Street. In both directions, Broadway/Main Street is two lanes, a thru and a thru/right, with a separate bike lane. The Memorial Drive approaches are both one right turn lane. Crosswalks are located across both Memorial Drive approaches. Parking is permitted to the west of the intersection along the north side of Broadway/Main Street westbound.

Main Street/Ames Street is a four leg signalized intersection located on the southern edge of the KSURP development area. The southbound Ames Street approach provides a left/thru lane and a right turn only lane and a separate bike lane. The Ames Street northbound approach provides one general purpose lane. Main Street provides one general purpose lane in each direction. Protected bike lanes are provided along the north-, south- and eastbound approaches and crosswalks are provided across all intersections. East of the intersection on the north side of Main Street is an EZRide stop for the MIT Shuttle. Parking is permitted along all approaches near the intersection.

Main Street/Galileo Galilei Way/Vassar Street is a four leg signalized intersection adjacent to the proposed Whitehead addition. The Galileo Galilei Way southbound approach provides three lanes with a left turn only lane, a thru lane, and a right turn only lane. The northbound Vassar Street approach provides a left/thru lane and a thru/right lane, with a separate bike lane. Main Street travels east-west through the study area providing two lanes, a left turn and a thru/right, with a separate bike lane on both eastbound and westbound approaches. Crosswalks are located at each leg of the intersection with wheelchair ramps. Just south of the intersection on the east side of Vassar Street is an EZRide stop for the MIT Shuttle.

Massachusetts Avenue/Vassar Street is a four leg signalized intersection located southwest of the proposed development area. The Vassar Street northeast and southeast approaches provide two lanes with one left turn only and one thru/right

lane and a bike lane in both directions. Massachusetts Avenue is two lanes in each direction with one left/thru lane and one thru/right lane. Crosswalks are located at each leg of the intersection with wheelchair ramps. Just north of the intersection on both sides of Vassar Street is an MBTA bus stop for the Crosstown 2 (CT2) bus. Additionally, on the east side of the Vassar Street south-westbound leg is an EZRide stop for the MIT Shuttle. Parking is permitted on the north side of the Massachusetts Avenue north-westbound approach.

Memorial Drive/Route 3/Ames Street is a two leg unsignalized intersection with stop control on the Ames Street southbound approach. Ames Street southbound provides one thru/right lane at the intersection. The Ames Street thru lane crosses Memorial Drive south-westbound to become a stop controlled left turn onto Memorial Drive north-eastbound. Memorial Drive is free flowing in the south-west direction with one left/thru lane and one thru lane at the intersection. Crosswalks are located at each leg of the intersection with wheelchair ramps. Parking is permitted along the north side of Memorial Drive.

Massachusetts Avenue/Memorial Drive/ Westbound On/Off-Ramps and **Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps** are two separate, but clustered, signalized intersections located southwest of the proposed development area. The southern intersection includes the Memorial Drive north-eastbound off-ramp and Massachusetts Avenue. Memorial Drive north-eastbound is a one-way right turn only lane. Massachusetts Avenue north-westbound provides one through lane and one thru/right lane. The south-eastbound approach provides two thru lanes. The northern intersection includes the Memorial Drive south-westbound off-ramp Massachusetts Avenue. Memorial Drive south-westbound is a one-way right turn only lane. Massachusetts Avenue north-westbound is one left turn only lane and two thru lanes. Massachusetts Avenue south-eastbound provides a through and a thru/right lane. There are bike lanes along both sides of Massachusetts Avenue at each intersection. Crosswalks with wheelchair ramps are located around the exterior of the two intersections. Just north of the intersections on the east side of Massachusetts Avenue is an MBTA bus stop for Route 1. Parking is prohibited at the intersection approaches.

Data Collection

Due to ongoing construction of the Longfellow Bridge, turning movement counts (TMCs) and automatic traffic recorder (ATRs) conducted at this time would not reflect typical traffic conditions. Therefore, turning movement counts conducted as part of other recent area studies will be used. These studies include the following:

- ARE, Binney TIS (May, 2009)
- Longfellow Bridge (January, 2010)
- Kendall Square K2 Plan Study (October, 2010)
- 300 Massachusetts Avenue TIS (April, 2013)

- 40 Thorndike Street TIS (May, 2013)

Many of the study area intersections have been counted under these various projects with the exception of Massachusetts Avenue/Memorial Drive Westbound and Eastbound and Memorial Drive/Route 3/Ames Street. These two intersections were counted in October, 2014. To account for the various years and months the TMC data was collected, all intersections were grown to October 2014 volumes using a 0.5 percent growth per year. In addition, some intersection volumes had to be proportionally adjusted to match adjacent intersection volumes if they were associated with different projects and counted during different time periods.

All of the TMCs captured the study area intersections during the morning and evening peak periods, 7:30 AM – 9:30 AM and 4:30 PM – 6:30 PM, respectively. The study area's traffic peak hours were determined to be 8:15 AM – 9:15 AM for the morning peak hour and 5:00 AM – 6:00 PM for the evening peak hour. Existing peak hour traffic volumes are shown in Figures 2.3a and 2.3b for the morning and evening commuter peaks, respectively.

ATR counts from the FST Kendall Square Urban Renewal Area 2013 Traffic Count Program and Trip Generation Analysis from May 2013 are presented in Table 2-2. The ATRs were collected for a total of eight consecutive days between May 11, 2014 and May 18, 2014. Counts for the 2014 report were provided, but due to the Longfellow Bridge construction a significant change in volumes was seen between the 2013 and previous years and the 2014 counts. This shift does not reflect the typical travel patterns or volumes seen on the study area roadways and therefore the 2013 ATR counts were used instead of the 2014 ATR counts.

All five locations counted in the study are within close proximity to the Project area. these locations include: 1) Main Street, east of Ames Street; 2) Broadway, east of the Mid-Block Connector; 3) Binney Street, west of Fifth Street; 4) Third Street, north of Broadway; and 5) Vassar Street, southwest of Main Street and the Western Connector. Table 2-2 provides a breakdown of the 2013 ATR counts and average weekday traffic volumes at the five locations.

Table 2-2 Existing Average Weekday Hourly Traffic Volumes

Hour	Main Street, east of Ames Street		Broadway, east of Mid-Block Connector		Binney Street, west of Third Street		Third Street, north of Broadway		Vassar Street, south of Main Street	
Commencing	EB	WB	EB	WB	EB	WB	NB	SB	NB	SB
12:00 AM	75	19	107	125	60	43	41	36	73	45
1:00	57	9	63	74	37	30	25	26	47	28
2:00	33	5	39	43	23	19	19	18	35	19
3:00	22	5	32	36	23	31	13	14	25	21
4:00	29	9	51	67	30	65	14	22	36	36
5:00	60	15	94	348	64	284	76	77	108	127
6:00	117	48	277	551	161	476	187	173	231	287
7:00	243	79	471	654	279	570	294	283	413	409
8:00	306	87	694	763	347	653	401	340	548	475
9:00	328	89	610	714	270	343	355	317	525	480
10:00	304	78	459	620	270	343	308	265	420	330
11:00	293	81	445	583	334	329	276	250	366	312
12:00 PM	295	86	467	585	370	339	283	261	354	324
1:00	307	88	520	540	402	327	292	269	350	309
2:00	363	91	651	554	551	304	309	305	369	367
3:00	389	85	658	575	731	302	346	410	414	396
4:00	374	112	689	626	757	326	340	520	420	409
5:00	385	128	797	633	773	391	345	551	537	459
6:00	353	131	649	633	528	360	333	459	446	350
7:00	238	96	496	493	335	212	239	284	314	254
8:00	203	58	358	399	227	167	178	200	237	167
9:00	192	49	311	355	171	142	151	159	190	175
10:00	163	39	264	325	129	109	123	127	162	150
11:00	125	33	193	221	103	72	87	90	116	86
Daily Total	**5,250**	**1,518**	**9,393**	**10,520**	**6,976**	**6,234**	**5,034**	**5,456**	**6,737**	**6,014**
Average Weekday Traffic Volume	**6,767**		**19,913**		**13,210**		**10,490**		**12,751**	

Crash Data

Crash data was investigated and quantified for the study area. Data was obtained from MassDOT for the most recent three-year period available (2010-2012) for the intersections within the study area. Crash results are summarized in Table 2-3.

Table 2-3 Summary of Crash Data (2010-2012)

	O'Brien Highway/ Third Street	Cambridge Street/ Third Street	Cambridge Street/ First Street	O'Brien Highway/ Cambridge Street/ East Street	O'Brien Highway/Land Boulevard/ Charlestown Avenue	Binney Street/ Galileo Galilei Way/ Fulkerson Ave	Binney Street/ Third Street	Binney Street/ First Street	Binney Street/ Land Boulevard	Broadway/ Galileo Galilei Way	Broadway/ Ames Street	Broadway/ Third Street	Broadway/ Main Street/ Memorial Drive	Main Street/Ames Street	Main Street at Galileo Galilei Way/ Vassar Street	Mass. Ave/ Vassar Street	Memorial Drive/Route 3/ Ames Street	Mass. Ave/ Memorial Drive On/Off-Ramps	Total
Year																			
2010	5	5	3	4	14	4	6	6	3	9	3	3	3	1	5	11	1	17	103
2011	5	6	4	2	9	2	3	1	3	7	5	4	5	1	10	17	3	16	106
2012	7	4	7	7	13	1	6	4	1	7	2	5	4	1	4	14	5	22	117
Total	17	15	14	13	36	7	15	11	7	23	10	12	12	3	19	42	9	55	326
Average	5.67	5.00	4.37	4.33	12.00	2.33	5.00	3.67	2.33	7.67	3.33	4.00	4.00	1.00	6.33	14.00	3.00	18.33	108.67
Collision Type																			
Angle	6	8	3	3	8	2	4	5	1	13	1	3	0	0	8	11	2	22	102
Head-on	0	1	2	0	3	0	0	2	0	1	0	0	2	0	1	3	0	2	18
Rear-end	7	3	3	2	15	2	4	1	3	1	5	3	4	0	3	10	5	17	90
Rear-to-Rear	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1
Sideswipe, opposite direction	0	0	0	2	0	0	0	0	0	0	0	0	0	0	1	0	0	0	3
Sideswipe, same direction	0	2	4	3	4	1	0	1	1	2	1	2	2	2	4	6	1	6	42
Single vehicle crash	3	1	1	3	6	1	4	1	2	6	1	4	4	0	2	4	0	8	52
Unknown	0	0	0	0	0	1	0	1	0	0	1	0	0	1	0	2	0	0	6
Not reported	0	0	1	0	0	0	3	0	0	0	1	0	0	0	0	6	1	0	12
Total	17	15	14	13	36	7	15	11	7	23	10	12	12	3	19	42	9	55	326
Crash Severity																			
Fatal injury	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Non-fatal injury	2	6	5	5	7	2	4	3	3	8	4	6	4	0	6	17	2	21	106
Property damage only (none injured)	11	4	4	5	27	4	7	6	3	9	5	5	6	2	7	14	5	31	160
Not Reported	4	5	3	3	2	1	4	2	1	5	1	1	2	1	6	10	2	3	56
Unknown	0	0	1	0	0	0	0	0	0	1	0	0	0	0	0	0	0	0	2
Total	17	15	14	13	36	7	15	11	7	23	10	12	12	3	19	42	9	55	326
Time of Day																			
Weekday, 7:00 AM - 9:00 AM	5	2	1	1	6	1	2	1	4	2	2	0	1	1	1	8	1	5	44
Weekday, 4:00 PM - 6:00 PM	0	2	2	2	5	2	2	1	1	7	1	3	2	0	6	5	2	7	51
Saturday, 11:00 AM - 2:00 PM	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	1	0	1	4
Weekday, other time	8	7	9	8	15	3	8	6	2	10	7	7	8	2	10	20	3	29	165
Weekend, other time	4	4	2	2	10	1	3	3	0	2	0	2	1	0	2	8	3	14	62
Total	17	15	14	13	36	7	15	11	7	23	10	12	12	3	19	42	9	55	326
Pavement Conditions																			
Dry	11	10	11	6	31	3	10	6	6	19	8	8	11	0	14	29	7	46	239
Wet	5	5	1	6	5	3	3	5	1	4	1	3	1	2	5	8	1	8	70
Snow	0	0	2	0	0	0	1	0	0	0	0	0	0	1	0	0	0	1	5
Ice	1	0	0	0	0	0	0	0	0	0	0	0	0	0	0	1	0	0	2
Sand, mud, dirt, oil, gravel	0	0	0	0	0	1	0	0	0	0	0	0	0	0	0	0	0	0	1
Water (standing, moving)	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Slush	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Other	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Unknown	0	0	0	0	0	0	0	0	0	0	0	1	0	0	0	0	0	0	1
Not reported	0	0	0	1	0	0	1	0	0	0	1	0	0	0	0	4	1	0	8
Total	17	15	14	13	36	7	15	11	7	23	10	12	12	3	19	42	9	55	326
Non Motorist (Bike, Pedestrian)	1	1	6	2	3	2	2	1	1	2	3	4	2	1	7	14	0	7	60
MassDOT Crash Rates	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.76	0.58	0.76	0.76	0.76	0.76	0.76	-
Calculated Crash Rate	0.48	0.75	0.94	0.39	0.57	0.38	0.59	0.72	0.22	0.71	0.51	0.48	0.46	0.24	0.89	1.50	0.26	1.71	-
Exceeds? (Yes or No)	No	No	Yes	No	No	No	No	No	No	No	No	No	No	No	Yes	Yes	No	Yes	-

Based on the crash data from the three most recent years, 2010 – 2012, five study area intersections have no crashes reported and are not presented in Table 2-3 above. These intersections include:

- Binney Street/North Garage West Driveway *(Unsignalized)*
- Binney Street/North Garage East Driveway *(Unsignalized)*
- Broadway/North Garage West Driveway *(Unsignalized)*
- Broadway/North Garage East Driveway *(Unsignalized)*
- Broadway/Main Street/Memorial Drive *(Unsignalized)*

Of the intersections with reported crashes, four exceed the MassDOT Average Crash Rate. These intersections include:

- Cambridge Street/First Street *(Signalized)*
- Main Street at Galileo Galilei Way/ Vassar Street *(Signalized)*
- Massachusetts Avenue/Vassar Street *(Signalized)*
- Massachusetts Avenue/Memorial Drive On-/Off-Ramps *(Signalized)*

Cambridge falls within the District 6 area of Massachusetts where the average crash rate for signalized intersections is 0.76 crashes per million entering vehicles and for unsignalized intersections 0.58 crashes per million entering vehicles. All of the intersections with calculated crash rates over the district average are signalized. There have been two fatal accidents, one at Cambridge Street/First Street and one at Massachusetts Avenue and Vassar Street. The fatal accident at Cambridge Street/First Street was between a pedestrian and a vehicle traveling westbound and occurred approximately 60 feet east of the intersection. The accident occurred in 2012 after dark under dry weather conditions. The accident at Massachusetts Avenue/Vassar Street occurred between a truck and a cyclist. The truck was traveling northbound on Massachusetts Avenue turning right onto Vassar Street when it struck the cyclist. This accident occurred at night in 2011 when it was raining and the roads were wet.

Two intersections have a calculated crash rates well above the Massachusetts District 6 average. The intersection of Massachusetts Avenue at Vassar Street has a calculated crash rate of 1.50 (42 over 3 years) crashes per million entering vehicles. One accident, as discussed previously, resulted in a pedestrian fatality and another 13 involved a pedestrian or bicyclist. 17 reported non-fatal injuries, while 14 reported only property damage. The majority of reported crashes occurred under dry conditions during non-peak weekday hours. The intersections of Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps and Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps reported 55 crashes occurring over three years resulting in a crash rate of 1.71 crashes per million entering vehicles. The intersection is really a cluster of two intersections controlled by one control box, but for the purposes of the crash analysis it will be treated as one large intersection. No fatal accidents were reported, while 21

reported non-fatal injuries, 31 reported only property damage, and 3 did not report the crash severity. The majority of crashes, 29, occurred during non-peak weekday hours and 14 occurred during non-peak weekend hours.

MassDOT crash rate worksheets for all intersections and collision diagrams for intersections with more than 3 crashes per year are provided in Appendix C.

Public Transportation

The Massachusetts Bay Transportation Authority (MBTA) provides a variety of services near the Project area. The Kendall Square MBTA Station is located within less than a quarter-mile east of the site along Main Street and the Central Square MBTA station is less than one-mile west of the site. The stations provide access to the MBTA's Red Line providing service to Alewife to the northeast, downtown Boston and Braintree and Ashmont to the south. The Red Line connects with the Green Line at Park Street and the Orange and Silver Lines at Downtown Crossing. Connections to all southern commuter rail lines, the Red Line and Silver Line are made at South Station. In addition, the Fitchburg commuter rail line connects with the Red Line at Porter Square.

The Project area is also less than one-mile from the Lechmere MBTA Green Line Station. Lechmere is the first stop on the E Branch of the Green Line providing service through North Station and Park Street destined for the Heath Street Station in the Mission Hill neighborhood of Boston. The E Line connects with all other Green Line Branches and the Red Line at Park Street Station. North Station connects the Green Line to the Orange Line and all northern commuter rail lines.

The MBTA operates the following four bus routes that provide service within one-quarter mile of the KSURP area:

- **Crosstown 2 (CT2)** bus route operates on 20-minute headways during peak hours between Sullivan Square in East Cambridge and Ruggles Station. Passengers may connect to the Red Line at Kendall/MIT Station and the Needham, Franklin, Attleboro/Providence, and Stoughton Commuter Rail Lines, in addition to the Orange Line and other various MBTA bus routes at Ruggles Station. The closest stop is at the intersection of Hampshire Street and Portland Street. This route operates between the hours of 5:55 AM and 7:37 PM on weekdays and does not operate on weekends or Holidays.
- **Route 64** connects Oak Square in Brighton to University Park, Cambridge, and Kendall/MIT Station. The bus travels through the Project study area along Broadway to Kendall/MIT Station providing service between Central Square and Kendall Square. It operates with 15 to 25-minute headways during the morning peak and 30-minute headways during the evening peak. The closest stop is at the intersection of Broadway and Galileo Galilei Way with service on weekdays from 6:42 AM to 9:30 AM and 4:05 PM to 6:55 PM. Limited service is provided on

Saturday and Sunday and some holidays. Saturday service starts at 5:20 AM providing one hour headways until 1:20 AM. Sunday service operates on one hour headways from 9:30 AM to 7:00 PM.

- **Route 68** operates between Harvard/Holyoke Gate and Kendall/MIT Station via Broadway. It operates with 30-minute headways during the morning peak and 40-minute headways during the evening peak. The closest stop is at the intersection of Broadway and Galileo Galilei Way. Service is provided from 6:35 AM to 6:51 PM on weekdays. This route does not operate on weekends or Holidays.
- **Route 85** operates with 40-minute headways during peak hours between Spring Hill in Somerville and Kendall/MIT Station via Summer Street and Union Square. The closest stop is at the intersection of Broadway and Galileo Galilei Way. Service is provided from 5:45 AM to 7:53 PM on weekdays. This route does not operate on weekends or Holidays.

In addition, the Charles River Transportation Management Association (CRTMA) operates the *EZRide* shuttle service between North Station, Lechmere, Kendall Square, University Park, and Cambridgeport. The shuttle thereby provides connections to the Green Line at Lechmere Station and the northern commuter rail services, as well as the Green and Orange lines at North Station. The shuttle operates every 8-10 minutes from North Station to Cambridgeport via Kendall Square during morning (6:20 AM to 10:52 AM) and evening (3:04 PM to 8:00 PM) commutes, and the midday (10:44 AM to 3:04 PM) shuttle operates every 20 minutes between Kendall Square and Northwest Campus. The shuttle runs Monday through Friday with no weekend and holiday service. *EZRide* stops within the Project area include Binney Street/Third Street, Broadway/Galileo Galilei Way, and Kendall Square. The shuttle has a varying payment structure separate from the MBTA pass, as *EZRide* and the CRTMA are not affiliated with the MBTA. All *EZRide* Shuttle buses feature front-mounted bike racks for up to two standard bicycles. Figure 2.4 illustrates existing MBTA and CRTMA *EZRide* services in the study area.

Bicycle and Pedestrian Facilities

The City is a large proponent of supporting active modes of transportation including biking and walking, and provides appropriate infrastructure to encourage this behavior. The KSURP area is well serviced by bicycle and pedestrian facilities, including on-street bike lanes, cycle tracks, sidewalks, crosswalks and multi-use pathways. Bicycle and pedestrian volumes were collected simultaneously with traffic volume counts during the peak hours. The volumes used are from various other traffic studies, consistent with the vehicle volumes used to analysis existing traffic conditions. Peak hour bicycle volumes are illustrated in Figures 2.5a and 2.5b. Peak hour pedestrian volumes are illustrated in Figures 2.6a and 2.6b.

The Project Component sites offer ample bicycle parking. Currently, there are approximately 100 on-street publicly accessible bicycle spaces around the Project Component sites. The Cambridge Center North Garage provides 25 covered bicycle spaces in a bike box accessible via the west driveway. In association with the proposed Ames Street Residences project, the Cambridge Center East Garage will provide approximately 138 covered bicycle spaces in a three-floor bicycle garage accessible from Pioneer Way. There will also be a smaller bicycle storage room inside the Cambridge Center East Garage for approximately 16 bicycles including tandem bikes and bikes with trailers. The Cambridge Center West Garage provides three (3) secured bicycle cages on the first level, and each cage has approximately 30 "inverted U" bicycle racks.

A 19-space Hubway station is located on the south side of Binney Street next to the North Garage East Driveway and across from the intersection of Binney Street and Sixth Street. Two other Hubway stations are located near the Three Cambridge Center site. A 19-space Hubway station is located along the north side of Main Street across from the intersection of Main Street and Hayward Street and a 15-space station is located along the north side of Broadway, outside of One Broadway. In addition the ample bicycle storage within the area, there are an abundance of bicycle lanes, cycle tracks, and multi-use pathways within the KSURP study area. Figure 2.7 shows the bicycle infrastructure within the area.

Pedestrian infrastructure within the KSURP study area allows for great connectivity to and from the Kendall Square MBTA Red Line Station and area businesses. Sidewalks are provided on all roadways within the study area ranging from 5 feet to 12 feet wide. Crosswalks are provided at all study area intersections with either a concurrent or exclusive pedestrian crossing, provided adequate time for pedestrians of all abilities to cross safely. As part of the City and MassDOT Broadway Improvements project, May 2011, the mid-block pedestrian crossing on Broadway between Ames and Third Streets was reconstructed with pedestrian warning signals. This mid-block crossing provides a valuable connection across the heavily travel road from the Boston Marriott and Cambridge Center East Garage on the south side of Broadway to the Volpe National Transportation Systems Center on the north side. Additionally, at Binney Street and Sixth Street there is a pedestrian crosswalk with flashing beacons to provide save crossing accommodations between the Cambridge Center North Garage to the south, and residences and businesses to the north.

The bicycle and pedestrian infrastructure throughout the study area and beyond provide safe accommodations that encourage people to use these alternative modes of transportation and not just rely on a motor vehicle.

Parking

Today, Cambridge Center provides an overall off-street parking supply of approximately 2,667 spaces all of which is in the form of structured parking. The

Cambridge Center North Garage (commonly referred to as the "Blue Garage") currently occupies one of the proposed redevelopment sites of the Project. This garage is a five-story, 1,136-space parking garage that provides monthly and transient parking. There are two other Cambridge Center parking garages located within the KSURP area. The Cambridge Center West Garage (commonly referred to as the "Yellow Garage") is located in the parcel bordered by Broadway, Ames Street, Main Street, and Galileo Galilei Way and contains 727 parking spaces. The Cambridge Center East Garage (commonly referred to as the "Green Garage") is located to the east of the West Garage bordered by Broadway, Ames Street, and Main Street and currently contains 804 spaces. (Note, approximately 40 parking spaces will be lost upon completion of the recently approved Ames Street Residences project). Figure 2.8 shows the location of the three major parking garages within the KSURP area. Garage occupancy counts are provided annually under the Urban Renewal Area Traffic Count Program and Trip Generation Analysis conducted by FST. Table 2-4 provides average weekday hourly parking occupancies of each garage and a summary of the total Cambridge Center garage occupancy for the week of May 3, 2014.

Table 2-4 Average Weekday Cambridge Center Garage Occupancy Counts (May 2014)

	North Garage		West Garage		East Garage		Total	
Hour Commencing	Spaces Occupied	Percent Occupied	Spaces Occupied	Percent Occupied	Spaces Occupied	Percent Occupied	Spaces Occupied	Percent Occupied
Total Spaces	**1,136**	**-**	**727**	**-**	**804**	**-**	**2,667**	**-**
12:00 AM	65	6%	51	7%	52	6%	168	6%
1:00	63	6%	51	7%	51	6%	165	6%
2:00	63	6%	50	7%	51	6%	164	6%
3:00	63	6%	52	7%	52	6%	167	6%
4:00	69	6%	55	8%	57	7%	181	7%
5:00	102	9%	70	10%	81	10%	253	9%
6:00	257	23%	116	16%	133	17%	506	19%
7:00	518	46%	220	30%	222	28%	960	36%
8:00	815	72%	392	54%	362	45%	1569	59%
9:00	980	86%	565	78%	521	65%	2066	77%
10:00	1,018	**90%**	637	88%	595	74%	2250	84%
11:00	1,019	**90%**	659	91%	616	**77%**	2294	**86%**
12:00 PM	1,009	89%	669	**92%**	612	76%	2290	**86%**
1:00	993	87%	648	89%	603	75%	2244	84%
2:00	946	83%	616	85%	563	70%	2125	80%
3:00	813	72%	544	75%	477	59%	1834	69%
4:00	565	50%	426	59%	347	43%	1338	50%
5:00	310	27%	273	38%	220	27%	803	30%
6:00	203	18%	184	25%	134	17%	521	20%
7:00	124	11%	129	18%	91	11%	344	13%
8:00	98	9%	90	12%	76	9%	264	10%
9:00	82	7%	67	9%	64	8%	213	8%
10:00	74	7%	58	8%	61	8%	193	7%
11:00	69	6%	53	7%	55	7%	177	7%

The Cambridge Center North Garage has a peak parking demand between 10:00 AM and 12:00 PM with 90 percent occupancy. At 90 percent the North Garage is operating at operational capacity, which is when the garage is 90 percent fully occupied. The Cambridge Center West Garage has a peak parking occupancy of 92 percent at 12:00 PM, indicating that the West Garage operates above operational capacity, during an average weekday. The Cambridge Center East Garage experiences a peak occupancy of 77 percent between 11:00 AM and 12:00 PM. As a whole the area wide parking demand occurs between 11:00 AM and 1:00 PM with an occupancy of 86 percent. The data shows that there is enough capacity in the total parking supply to accommodate current daytime demand. The area operates under operational capacity of 90 percent indicating that the area can handle additional demand. During overnight hours the garages are underutilized with an overall parking occupancy between six and seven percent.

In addition to off-street parking, on-street parking regulations were collected within a quarter-mile of the Cambridge Center North Garage and presented in Figure 2.9. Although not abundant, there are multiple areas within the KSURP where on-street parking is available.

Loading and Service Activities

Within the KSURP area, there are adequate loading docks to accommodate the existing demand. Eleven Cambridge Center provides two loading docks on the northeast side of the building accessible off of Broadway west of the Cambridge Center North Garage access road. Nine Cambridge Center (Whitehead) provides a large loading area with two loading docks accessible off of Galileo Galilei Way northbound. Three Cambridge Center does not have a loading area on-site and uses the Cambridge Center East Garage loading dock off of Ames Street. In addition to these loading dock locations many delivery and service vehicles use the North Garage access roads to park and make deliveries to surrounding buildings.

The most active of the loading docks is the Cambridge Center East Garage loading dock off of Ames Street, which serves Three Cambridge Center, Four Cambridge Center and Five Cambridge Center. On an average day there are between 25 and 35 vans and trucks using the loading docks located at the East Garage.

Future 2024 No-Build Conditions

Roadway Improvement Projects

There are current and future roadway improvement projects within the Kendall Square Urban Renewal study area that have been incorporated into the future analysis conditions. These projects are described below:

- **Broadway/Third Street** intersection is being updated to 'T' up the Broadway eastbound U-Turn onto Main Street. The movement will be taken at the intersection with the new intersection alignment. The intersection will provide 3-lanes eastbound, a left-only, one thru and one thru/right lane in the future. Broadway westbound will provide one thru land and one right-only lane in the future. The Third Street southbound approach will provide one right only lane and one through/left lane. The new northbound approach is a receiving-only lane providing access from Broadway eastbound and Third Street to Main Street westbound.

- **Ames Street Residences** is located at 88 Ames Street within the Kendall Square Urban Renewal Area, is a new 280-unit residential building attached to the Cambridge Center East Garage. This project will include the redesign of the

section of Ames Street between Main Street to the south and Broadway to the north. The new roadway layout will provide one lane in each direction, with a two-way cycle track and on-street parking on the east side of the street. The intersections of Ames Street with Broadway and Ames Street with Main Street will include bicycle signals to integrate the cycle track into the existing intersections. The new signal timing were not integrated into the future analysis as the final design is still being worked out.

- **North Point Parcel** development is a large mix-use commercial, research and development, residential, and retail development located north of Monsignor O'Brien Highway and west of Charlestown Avenue (Gilmore Bridge). This project includes roadway improvements to O'Brien Highway from Third Street to Industrial Park Road. With the relocation of Lechmere Station under the Green Line Extension Project, First Street will be extended north to connect with O'Brien Highway at a signalized intersection. The intersection of O'Brien Highway/Cambridge Street/East Street will be reconfigured as well. All signalized intersections within the project limits will be optimized and retimed to accommodate the North Point development traffic and new traffic patterns from the roadway improvements. The changes implemented within the proposed Project's future conditions are based on the most current plans available at the time of the Notice of Project Change filing which would be the 25 percent Submittal of the Monsignor O'Brien Highway Access Permit Plan.

- **Alexandria Center at Kendall Square** is a mix-use, multiple building development primarily redeveloping parcels along Binney Street between Third and First Streets. The adjacent stretch of Binney Street (from Third Street to Land Boulevard) will be reconstructed as part of this development. The Binney Street and Land Boulevard intersection improvements will including an additional northbound left turn lane, a new crosswalk along the southern approach and retiming the intersection to allow for a 120 second cycle length and concurrent pedestrian crossings. The Binney Street and First Street intersection will be reconstructed with new signal equipment to provide a 120 second cycle length in coordination with the Binney Street/Land Boulevard intersection to provide better flow through these two closely spaced intersections. The signalized intersections along Binney Street including the Binney Street and Third Street intersection will be coordinated to provide better east/west travel through the corridor. In addition to these intersection improvements this section of Binney Street will reconstruct the sidewalks and install an off street cycle track between Frist Street and Third Street that will connect to a proposed cycle track along Binney Street to the west of Third Street. This latter section of the cycle track is being constructed by the City and will be discussed in further detail under the Mitigation Section. On-street parking will also be added along Binney Street at various sections in front of the new Alexandria buildings.

Future Development Projects

There are other specific planned projects within the area of the Project area that will add additional traffic to the study area network. Due to the unique circumstances in which the 2014 existing network volumes were developed, a conservative approach was taken in determining which development projects would be included in the background projects. Some of the projects included in this analysis have been completed or partially completed since 2014, but these project generated volumes were not captured in some of the TMCs that were used. Therefore, trip forecasts for these development projects were added to the networks to provide a conservative approach. The vehicle trips generated by these projects have been added to the 2024 No-Build volumes to estimate future conditions without the proposed Project in place. These trips have been adjusted to account for mode split based on the individual projects' transportation study. A description of each project is provided below and categorized by project status.

The following three projects have been completed:

- **Broad Institute Expansion** is a 15-story building build within the KSURP area fronting Ames Street and expanding over the preexisting Cambridge Center West Garage. The building contains 246,000 square feet of research and development (R&D) and 4,000 square feet of ground floor retail/restaurant use. The facility houses state-of-the-art laboratory and ancillary space. A series of connector bridges link the new building to Broad's original headquarters at Seven Cambridge Center. The project was expected to generate 88 weekday morning and 82 weekday evening peak hour vehicle trips. This project was completed in 2014.

- **Seventeen Cambridge Center (BioGen)** includes a new building with 156,000 square feet of office/R&D and 13,000 square feet of daycare use. The project is linked to the preexisting BioGen building via a two-level connector. The project was predicted to generate 59 weekday morning and 52 weekday evening peak hour vehicle trips. The building was completed in 2013.

- **1 Education Street** includes the construction of a new building totaling 226,000 square feet of mixed-use office and education space. Parking for staff and visitors will be accommodated on the lower levels of the building, below the office and education space. The garage will accommodate up to 150 vehicles. This project is expected to generate 107 weekday morning and 99 weekday evening peak hour vehicle trips. This project was opened in the fall of 2014.

The following seven projects are partially completed or under construction:

- **300 Massachusetts Avenue** includes the redevelopment of the 300 Massachusetts Avenue Parcel with the construction of 257,500 square feet, including 242,500 square feet of office and R&D and 15,000 square feet of ground floor retail. Due to the similar size and nature of the land use in terms of traffic generation, the replacement ground floor retail has not been predicted to impact the site trip generation. The new office and R&D space is expected to generate 206 morning peak hour vehicle trips and 198 evening peak hour vehicle trips. Parking will be provided in the nearby existing 55 Franklin Street Garage and other University Park garages. This project is currently under construction and expected to be completed in 2016.

- **Novartis R&D Expansion** at 181 Massachusetts Avenue consists of the demolition of the existing building and the associated surface parking facility at 21 Osborn Street. Two buildings will be constructed, totaling 530,000 square feet of R&D and laboratory space. A retail component of 8,000 square feet is also proposed for the ground floor frontage along Massachusetts Avenue. The site also includes a 35,000 square feet building at 209 Massachusetts Avenue that will be renovated. On-site below-grade parking accommodating 450 vehicles will be provided for employees. The site is predicted to generate 277 morning peak hour vehicle trips and 259 evening peak hour vehicle trips. This project is currently under construction and expected to be completed in 2015.

- **650 Main Street Office/R&D Development Project** includes a building comprising of two wings totaling 416,000 square feet. Wing A, fronting Main Street and Portland Street, is 186,000 square feet. Approximately 8,4000 square feet of Wing A will comprise of street level retail space. An 820-space, three-level, below-grade parking garage will support the development. It was determined that this project will not result in a significant change in trip generation.

- **North Point** is a 45-acre mixed-use development site located north of Monsignor O'Brien Highway and west of Charlestown Avenue (Gilmore Bridge). The site includes a total of twenty development parcels with approximately 2.3 million square feet of residential and 2.2 million square feet of commercial space. This project will also include the O'Brien Highway improvement project, previously discussed.

- **22 Water Street** includes the construction of 392 residential units (528,000 square feet). An on-site parking space will be provided for each unit, with access off Water Street. A future connection from Water Street to East Street as part of the larger abutting North Point mixed-use development is also considered. The site is predicted to generate 104 morning peak hour vehicle trips and 123 evening peak hour vehicle trips. This project is currently under construction and expected to be completed in the spring of 2015.

- **Maple Leaf at 23 East Street** consists of the redevelopment of the existing Maple Leaf building from general office use to 104 residential apartment units. This project includes high-finish, micro-loft units ranging in size from 318 square feet to 665 square feet. All of the units will be studio or one bedroom units. It is expected that the residential building will function similarly as the existing Archstone building with similar traffic and parking demands. Parking will be provided in the Archstone garage.

- **Alexandria Center at Kendall Square** includes the redevelopment of six parcels totaling 1,753,200 square feet, supported by 1,932 parking spaces. 50 Binney Street contains 10 stories of 484,000 square feet of R&D, 7,000 square feet of ground level retail use, and 442 below grade parking spaces. 100 Binney Street includes a 10-story building with 385,000 square feet of R&D, 3,000 square feet of ground level retail use, and 681 below grade parking spaces. A portion of the 41 Linskey Way building was preserved for the physical representation of the Mixed-mode Transportation Hub. The first floor and basement is a bicycle center, while an additional building functions as the pedestrian access to the garage below and 1,000 square feet of retail. 75 Binney Street is a five-story building with 164,000 square feet of R&D and 2,000 square feet of retail. 125 Binney Street is a five-story building with 173,000 square feet of R&D and an eight-story residential building. The below grade garage for 75 Binney Street and 125 Binney Street has a total of 532 parking spaces. 270 Third Street has 8,000 square feet of ground floor retail and 70 residential units. 225 Binney Street contains a five-story building with 308,000 square feet of R&D and 277 below grade parking spaces. 161 First Street is a five story building containing 150 residential units. Rogers Street Park and Triangle Park are two new green spaces. Of the six sites 255 Binney Street was completed in 2013 and 50 Binney Street, 75/125 Binney Street, 100 Binney Street, 270 Third Street, are currently under construction. 100 Binney Street is scheduled to start construction in 2015.

The following two projects are currently being proposed to the City:

- **Courthouse Redevelopment** includes the redevelopment of the existing courthouse building into 460,000 square feet of R&D/office space, 15,000 square feet of retail, and 24 residential apartments. The courthouse is currently vacant with the exception of the four-story jailhouse on the top floors. Parking will be provided by a mix of 92 below grade on-site spaces and 420 parking garage spaces on First Street that are expected to be leased on a long-term basis from the City. The site is expected to generate 253 weekday morning peak hour vehicle trips and 270 weekday evening peak hour vehicle trips. This project is currently in the design review process.

- **Ames Street Residences** is a 200,000-square foot, 22-story, multi-family residential building with 16,000 square feet of retail space on the ground floor. There will be a total of 280 units consisting of a mix of micro-units, studios, one-bedrooms, and two-bedrooms. The Cambridge Center East Garage will allocate

140 existing parking spaces for Ames Street residents. This project is currently under review.

General Background Traffic Growth

In addition to the area developments described above, a general area-wide traffic growth rate was applied to existing condition peak hour traffic volumes to reasonably account for other future through traffic growth in the Project study area. An annual growth rate of 0.5 percent per year between 2014 and 2024 was applied to the 2014 Existing Condition vehicle volumes.

Figures 2.10a and 2.10b provide the 2024 No-Build Condition morning and evening peak hour traffic volume networks.

Future 2024 Build Conditions

The 2024 Build Condition was developed to evaluate the future transportation conditions associated with the proposed Project. The 2024 Build Condition traffic volumes for study area roadways were developed by estimating Project-generated traffic volumes, distributing these volumes, and assigning them to the study area intersections. The traffic volumes expected to be generated by the proposed Project were added to the 2024 No-Build Condition traffic volumes to create the 2024 Build Condition traffic volume networks. The following sections describe the procedures used to develop the 2024 Build Condition traffic volume networks.

Trip Generation

To estimate traffic generated by the Proposed Project, Institute of Transportation Engineers (ITE) trip generation rates for Apartment (LUC 220), Shopping Center (LUC 820), and General Office Building (LUC 710) were used. ITE rates produce unadjusted vehicle-trips for weekday daily, morning and evening peak hours. The unadjusted daily vehicle-trips are presented in Table 2-5.

The ITE unadjusted vehicle trips were converted into person-trips by applying a national average vehicle occupancy (AVO) of 1.13 for residential and work related trips and 1.78 for retail trips. The national AVO rates are based on the 2009 National Household Travel Survey.

Table 2-5 ITE Unadjusted Daily Vehicle Trips

Project Component/ Land Use	Trips In	Trips Out	Trips Total
Cambridge Center North Garage Office Buildings			
Office	2,513	2,513	5,026
Total	2,513	2,513	5,026
Whitehead Institute (Nine Cambridge Center)			
Office	445	445	890
Total	445	445	890
Broad Institute (75 Ames Street)			
Office	156	156	312
Total	156	156	312
Eleven Cambridge Center (Existing to be demolished)			
Office	-536	-536	-1,072
Eleven Cambridge Center Residential Building			
Residential	953	953	1,905
Retail	1,379	1,379	2,758
Total	1,796	1,796	3,591
Three Cambridge Center (Existing to be demolished)			
Retail	-1,941	-1,941	-3,882
Office	-461	-461	-922
Three Cambridge Center Mixed Use Building			
Residential	868	868	1,736
Retail	1,193	1,193	2,386
Office	687	687	1,374
Total	346	346	692
Total	**5,256**	**5,256**	**10,512**

Area mode splits were then used to proportion the calculated person-trips into various transportation modes including vehicle (drive), transit, walk, bike and other (telecommute, flextime, etc.). Residential mode split is based on the City's K2 Plan Study Enhanced TDM Mode Shares information presented at the Kendall Square Advisory Committee Meeting on January 26, 2012. Office and Retail mode splits are based on the FST *Kendal Square Urban Renewal Area 2014 Traffic Count Program and Trip Generation Analysis Report* from May 2013. Table 2-6 presents the mode splits used.

Table 2-6 Project Mode Splits

Mode	Residential[1]	Office[2]	Retail[3]
Vehicle	32%	34%	34%
Transit	30%	37%	37%
Walk	25%	6%	6%
Bike	10%	9%	9%
Other	3%	14%	14%

Source: 1-City of Cambridge K2 Plan Enhanced TDM Mode Shares
2-FST Kendall Square Urban Renewal Area Mode Shares
3-FST Kendall Square Urban Renewal Area Mode Shares

A local AVO for residential and office/retail was calculated from the 2006-2010 American Community Survey to be 1.11 and 1.19 respectively. More recent data does not provide accurate origin - destination flow data to calculate residential AVO separate from office/retail AVO. The local AVO was used to convert the person-trips to vehicle-trips for the vehicle trip estimate. The resulting project trip generation by mode for the proposed Project is summarized in Table 2-7 below. Detailed project trip generation tables by building and land use are provided in Appendix C.

In total, the Project is expected to generate approximately 3,638 daily vehicle trips, with 390 occurring in the morning peak hour and 444 in the evening peak hour. Due to the numerous public transportation options within close proximity to the sites approximately 4,410 daily transit trips (639 during the morning peak hour and 716 during the evening peak hour) will be generated by the proposed development. In addition, approximately 1,544 daily pedestrian trips and 1,184 bicycle trips will be generated.

As discussed previously, the actual trip generation within the KSURP area has been lower than the accepted trip generation methodology as presented in the ITE Trip Generation Handbook. The annual FST report discusses this difference and presents a yearly analysis on the estimated versus observed trip generation by the KSURP area, as previously shown in Figure 2.1. Over the past ten years the estimated vehicle trip generation has been an average of 15 percent higher than observed trips. The data also shows that there has been very little change, year to year, in the number of project trips to the area if no additional development was built. The KSURP Amendment No. 10 Project generated trips are added to the 2014 estimated trips to show the impacts of the Project on the area trip generation. The average percent difference between estimated and observed was applied to the Project generated trips to show the anticipated actual number of trips the KSURP area will generate in the 2024 Build Condition.

The trip estimates presented in Table 2-7 were estimated using the ITE Trip Generation Guidelines and are assumed to be a very conservative estimation of the total number of trips the entire Project will likely generate once constructed and fully occupied.

Table 2-7 Total Estimated Project Generated Trips

		Vehicle			Transit			Walk			Bike			Other		
		Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak	Daily	AM Peak	PM Peak
Residential	Entering	593	19	73	617	19	76	514	16	63	206	6	25	61	2	8
	Exiting	593	74	39	617	76	40	514	63	34	206	25	13	61	8	4
	Total	1,186	93	112	1,234	95	116	1,028	79	97	412	31	38	122	10	12
Retail	Entering	321	10	26	416	13	33	67	2	6	101	4	8	157	5	13
	Exiting	321	6	28	416	9	36	67	1	5	101	2	9	157	3	13
	Total	642	16	54	832	22	69	134	3	11	202	6	17	314	8	26
Office	Entering	905	247	47	1,172	389	106	191	65	18	285	94	27	444	147	41
	Exiting	905	34	231	1,172	133	425	191	22	69	285	34	103	444	51	161
	Total	1,810	281	278	2,344	522	531	382	87	87	570	128	130	888	198	202
Total	Entering	1,819	276	146	2,205	421	215	772	83	87	592	104	60	662	154	62
	Exiting	1,819	114	298	2,205	218	501	772	86	108	592	61	125	662	62	178
	Total	3,638	390	444	4,410	639	716	1,544	169	195	1,184	165	185	1,324	216	240

KSURP Area Traffic Analysis

The estimated number of Project generated vehicle trips to the KSURP area as calculated by ITE unadjusted daily vehicle trips is 10,512, while the adjusted Project generated vehicle trips, taking into account AVO and mode split, is estimated to be 3,638 daily trips. This reduction in vehicle trips, about 65 percent, is expected due to the use of conservative ITE rates, previously discussed, and the historical vehicular traffic trends within the KSURP area. The annual FST report on the traffic operations within the KSURP area has consistently shown the average annual weekday traffic (AAWDT) volumes in the KSURP area are well below the projected AAWDT volumes from the original 1977 FEIR. Figure 2.11 shows the historic AAWDT volumes in the area from 1994 to 2014 as well as the FEIR projected volume. The figure also illustrates the estimated traffic volumes within the area for the 2024 Build Condition. The estimated traffic volume was estimated by increasing the 2013 volume by one percent per year for eleven years. This growth takes into account general area wide background growth and specific planned projects in the area. The 2014 AAWDT volumes were not used due to the Longfellow Bridge Rehabilitation project having significant impacts of the average vehicular volumes in the area, as shown in the figure.

Under 2024 conditions it can be seen that the estimated AAWDT volumes are well below the 1977 FEIR projected traffic volume. The Project generated vehicle trips, unadjusted and adjusted, have been added to this estimated AAWDT volume to show the impacts of the Project related to vehicle volumes. The unadjusted trips add 10,512 trips to the conservative estimate of 68,725 trips calculated for the future background volumes for 2024. This causes the total Project generated and future traffic to nearly reach the FEIR projection of 83,300 trips. By incorporating the AVO and mode split, this number is reduced to 72,363, and this estimated value falls well below the FEIR projection. Due to the small range of AAWDT volumes from 1994-2014, this number seems large in comparison. The highest recorded volume during those years occurred in 2001 when the AAWDT was 63,750. In recent years, with the exclusion of 2014, the AAWDT value have been on the higher end of the volume range. As the graph shows, the traffic volume data can increase or decrease 5,000-10,000 trips during any given year. According to these projections, the adjusted 3,638 Project generated trips will only make up 5 percent of the total trips in 2024 and will fall short of the FEIR projection by more than 10,000 trips.

Trip Distribution

Project trips for the 2024 Build Condition were distributed through the study area intersection based on local trip distribution data. Trip assignments for the vehicles traveling to and from the sites are based on the K2 Plan Critical Sums Analysis – Trip Distribution Report from August 2012. The Critical Sums Analysis provides office and

retail distribution based on City of Cambridge PTDM data and residential distribution based on the 2000 U.S. Census Journey-to-Work survey. The K2 Plan report provides employee and residential arrival and departure distributions for particular sub-areas within the Kendall Square area. The proposed Project falls into sub-areas 2 and 3. Table 2-8 below and Figure 2.12 summarize the trip distribution used.

Table 2-8 Trip Distribution

Trip Assignment	Residential	Office/Retail
Main Street (West)	21%	18%
Vassar Street	14%	5%
Ames Street (Arrival/Departure)	7%/4%	9%/5%
Wadsworth Street (Departure)	3%	4%
Broadway/Main Street (East)	14%	24%
Land Boulevard	12%	12%
First Street	5%	6%
Third Street	9%	14%
Binney Street (Arrival)	3%	3%
Broadway (Arrival/Departure)	15%/18%	9%/12%

Source: Kendall Square Central Square Critical Sums Analysis – Trip Distribution Sub-Area 3 Maps

The Project trips were assigned to the study area network based on the data presented in Table 2-8 above. Figures 2.13a and 2.13b show the morning and evening peak hour trips distributed through the study area.

As previously mentioned, the adjusted Project generated trips were added to the 2024 No-Build traffic volumes to develop the 2024 Build Condition peak hour traffic volumes. These volumes are presented in Figures 2.14a and 2.14b.

Traffic Operations Analysis

Intersection capacity analysis was conducted for the 2014 Existing Condition, 2024 No-Build Condition, and 2024 Build Condition to determine how well the roadway facilities serve the existing and future traffic demands. These intersection operating conditions are classified by a quantified level of service (LOS).

LOS is a qualitative measure of control delay at an intersection providing an index to the operational qualities of a roadway or intersection. LOS designations rang from A to F, with LOS A representing the best operating conditions and LOS F representing the worst operating conditions. LOS designation is reported differently for signalized and unsignalized intersections.

For signalized intersections, the analysis considers the operations of each land or land group entering the intersection and the LOS designation is for overall conditions at

the intersection. For unsignalized intersections, however, analysis assumes that traffic on the mainline is not affected by traffic on the side streets. The LOS is only determined for left turns from the main street and all movements from the minor street. The LOS designation is for the most critical movement, which is most often the left turn out of the side street.

Synchro 8.0 software was used to evaluate the LOS operations at the study area intersections. This analysis is based on the 2000 Highway Capacity Manual (HCM). Table 2-9 below presents the level of service delay threshold criteria as defined in the HCM.

Table 2-9 Level of Service Criteria

Level of Service	Unsignalized Intersection Control Delay (sec/veh)	Signalized Intersection Control Delay (sec/veh)
LOS A	0 – 10	≤ 10
LOS B	> 10 – 15	> 10 – 20
LOS C	> 15 – 25	> 20 – 35
LOS D	> 25 – 35	> 35 – 55
LOS E	> 35 – 50	> 55 – 80
LOS F	> 50	> 80

Table 2-10 below summarizes the study area intersection overall level of service for all conditions during the AM and PM peak hours. Detailed intersection LOS tables and Synchro 8.0 reports are presented in Appendix C. The detailed LOS tables show the overall intersection and individual lane group volume to capacity ratios and delay, in seconds, as well as LOS. The overall intersection has been categorized based on the projects impacts with green having less than nine seconds of additional delay, yellow having 10 to 19 seconds of additional delay and red having more than 20 seconds of additional delay added to the overall intersection delay due to Project generated trips. The impacts of the Project trips at each intersection are quantified in the intersection descriptions following Table 2-10.

Table 2-10 Intersection Level of Service Summary

Intersection	2014 Existing Condition		2024 No-Build Condition		2024 Build Condition	
	AM	PM	AM	PM	AM	PM
O'Brien Highway/Third Street *(Signalized)*	F	F	E	F	E	F
Cambridge Street/Third Street *(Signalized)*	C	D	F	F	F	F
Cambridge Street/First Street *(Signalized)*	E	D	C	D	C	D
O'Brien Highway/Cambridge Street/East Street *(Signalized)*	C	F	B	D	B	D
O'Brien Highway/Land Boulevard/Charlestown Avenue *(Signalized)*	F	F	F	F	F	F
Binney Street/Galileo Galilei Way/Fulkerson Street *(Signalized)*	C	C	E	C	E	C
Binney Street/North Garage West Driveway *(Unsignalized)*	A	A	A	A	A	B
Binney Street/North Garage East Driveway *(Unsignalized)*	A	B	A	B	A	B
Binney Street/Third Street *(Signalized)*	F	F	F	F	F	F
Binney Street/First Street *(Signalized)*	D	D	D	D	D	D
Binney Street/Land Boulevard *(Signalized)*	E	C	E	E	E	E
Broadway/Galileo Galilei Way *(Signalized)*	F	F	F	F	F	F
Broadway/North Garage West Driveway *(Unsignalized)*	A	A	A	A	B	A
Broadway/North Garage East Driveway *(Unsignalized)*	A	B	B	B	C	B
Broadway/Ames Street *(Signalized)*	C	D	F	F	F	F
Broadway/Third Street *(Signalized)*	E	D	F	F	F	F
Broadway/Main Street *(Unsignalized)*	A	B	C	B	C	B
Broadway/Main Street/Memorial Drive *(Unsignalized)*	A	A	E	B	E	B
Main Street/Ames Street *(Signalized)*	D	C	E	D	E	D
Main Street/Galileo Galilei Way/Vassar Street *(Signalized)*	C	C	D	E	D	F
Massachusetts Avenue/Vassar Street *(Signalized)*	D	E	F	F	F	F
Memorial Drive/Route 3/Ames Street *(Unsignalized)*	E	F	F	F	F	F
Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps *(Signalized)*	B	F	B	F	B	F
Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps *(Signalized)*	F	F	F	F	F	F
O'Brien Highway/First Street *(Signalized)**	--	--	F	F	F	F

*Note: Intersection is to be constructed with the relocation of the MBTA Lechmere Station under No-Build Conditions

A description of LOS operations at each intersection is discussed below.

O'Brien Highway/Third Street operates at a LOS F during morning and evening peak periods under 2014 Existing Conditions. Under 2024 No-Build Conditions the intersection improves to an LOS E during the morning peak hour and greatly improves the overall delay experienced during the evening peak hour, although the intersection will continue to operate at LOS F. The re-optimization and geometry reconfiguration by the O'Brien Highway Improvement project greatly improves the intersection in the future. The 2024 Build Condition will increase overall delay by less than one second in the morning peak hour and 2.7 seconds in the evening peak hour. The overall intersection operations will be maintained at LOS E during the morning peak hour and LOS F during the evening peak hour.

Cambridge Street/Third Street operates at a LOS C during the morning peak hour and LOS D during evening peak hour under 2014 Existing Conditions. The increased traffic from 10 years of background growth and traffic due to planned development projects in the area degrade intersection operations to LOS F during both peak hours under 2024 No-Build Conditions. The intersection, with the addition of Project-generated trips will experiences an increase of 21.9 seconds of delay during the morning peak hour and 7.9 seconds during the evening peak hour. The intersection will continue to operate at LOS F during both peak hours under 2024 Build Conditions.

Cambridge Street/First Street, under 2014 Existing Conditions, operates at LOS E and LOS D during morning and evening peak hours, respectively. The Green Line Extension project and the North Point development will improve the area roadways which include improving the Cambridge Street/First Street intersection. First Street will be extended to O'Brien Highway adding a Frist Street southbound to the intersection. In the future the intersection will not allow left turns or a westbound approach and therefore traffic patterns will shift and the signal will be re-optimized. The intersection will improve during the morning peak hour to LOS C under 2024 No-Build Conditions and during the evening peak hour the intersection will continue to operate at LOS D. With the Project traffic added under 2024 Build Conditions, the intersection will continue to operate at a LOS C, with a delay increase of 0.4 seconds for the morning peak hour. The evening peak hour, under 2024 Build Conditions will increase overall delay by 3.9 seconds and continue to operate at a LOS D.

O'Brien Highway/Cambridge Street/East Street operates at LOS C and LOS F during the morning and evening peak hours respectively under 2014 Existing Conditions. Due to the infrastructure improvements at this intersection under 2024 No-Build Conditions the intersection improves to a LOS B during the morning peak hour and LOS D during the evening peak hour. The intersection continues to operate at these improved conditions under 2024 Build Conditions with an increase in delay of only 0.2 seconds during the morning peak hour and 3.1 seconds during the evening peak hour.

O'Brien Highway/Land Boulevard/Charlestown Avenue operates at a LOS F during the morning and evening peak hours under all conditions. The intersection is being improved under the North Point O'Brien Highway improvement project, but with the addition of other development project traffic and future area wide traffic growth the intersection continues to operate at LOS F. The Project is anticipated to add an additional 8.3 seconds of delay, during the morning peak hour, to the overall intersection operations and 8.1 seconds of delay during the evening peak hour.

Binney Street/Galileo Galilei Way/Fulkerson Street intersection operates at LOS C under 2014 Existing Conditions during the morning and evening peak hours. The intersection degrades to an LOS E during the morning peak hour under 2024 No-Build Condition due to the traffic increase on Fulkerson Street southbound from the future area growth and development projects. The intersection will continue to

operate at a LOS E, with a slight decrease in delay of 1.8 seconds, under 2024 Build Conditions. The evening peak hour continues to operate at LOS C under 2024 No-Build and 2024 Build Conditions, while the intersection shows slight improvement in delay of 1.4 seconds under 2024 Build Conditions.

Binney Street/North Garage West Driveway operates at a LOS A during the morning and evening peak hours under all conditions except during the evening 2024 Build Condition when the intersection operated at LOS B. The Project will increase delays at the North Garage Driveway approach by 9.4 seconds in the morning and 0.9 seconds in the evening.

Binney Street/North Garage East Driveway, under all analyzed conditions, operates at LOS A during the morning peak hour and LOS B during the evening peak hour. Under 2024 Build Conditions the Project will increase Driveway delays by 0.1 seconds in the morning and 1.6 seconds in the evening.

Binney Street/Third Street operates at an LOS F during both the morning and evening peak hours for all analyzed conditions. The Project-generated trips will impact the overall delay at this intersection with an increase of 15.6 seconds during the morning peak hour and 13.3 seconds during the evening peak hour.

Binney Street/First Street intersection operates at LOS D for both peak hours under 2014 Existing Conditions. Under the 2024 No-Build Condition the Alexandria project, previously discussed, implements signal and roadway improvements at this intersection to maintain an LOS D during both peak hours. The addition of Project trips does not greatly affect the operations at the intersection as the morning peak hour increases in delay by only 4.3 seconds and maintains a LOS D and the evening peak hour increases by 4.7 seconds and maintains an overall LOS D.

Binney Street/Land Boulevard, under 2014 Existing Conditions, operates at a LOS E during the morning peak hour and LOS C during the evening peak hour. With the Alexandria project the intersection has undergone capacity improvements and will be coordinated with the Binney Street corridor. These improvements will help offset the increased traffic estimated at this intersection in the future. During the morning peak hour the intersection continues to operate at LOS E and degrades to LOS E during the evening peak hour in the 2024 No-Build Condition. The Project impacts under the 2024 Build Conditions will only slightly increase overall intersection delay. The morning peak hour will increase by 1.4 seconds and maintain operations at LOS E. The evening peak hour will slightly decrease in delay, 0.6 seconds, and maintain an overall intersection LOS E.

Broadway/Galileo Galilei Way operates at a LOS F under all conditions for the morning and evening peak hours. This is due to the high volumes, particularly turning volumes, on Broadway and Galileo Galilei Way. The Project-generated trips added under the 2024 Build Condition will increase morning peak hour delay by 6.3 seconds. During the evening peak hour the Project trips will have a significant impact

on overall intersection delay with an increase of 48.2 seconds. This is due to a significant increase in vehicles wanting to turn left from Broadway onto Galileo Galilei Way.

Broadway/North Garage West Driveway intersection operates at LOS A for the morning and evening peak hours for the 2014 Existing and 2024 No-Build Conditions. The intersection falls to a LOS B during the morning peak hour due to the increase of 0.4 seconds in delay experienced by the North Garage West Driveway. The evening peak hour is expected to experience no increases in delay at the approach due to the addition of Project trips.

Broadway/North Garage East Driveway, under 2014 Existing Conditions, operates at a LOS A during the morning peak hour and LOS B during the evening peak hour. Increased westbound traffic on Broadway increases delays to the exiting traffic from the North Garage East Driveway and causes the intersection to operate at a LOS B during the morning peak hour and a LOS C under 2024 Build Conditions, with an increase of 2.1 seconds of delay. The intersection continues to operate at a LOS B for the evening peak hour under 2024 No-Build and 2024 Build Conditions, with an increase in delay of 2.5 seconds of delay.

Broadway/Ames Street operates at a LOS C and LOS D during the morning and evening peak hour, respectively under 2014 Existing Conditions. The intersection degrades to an LOS F for both peak hours under 2024 No-Build Conditions. This is due to the reconfiguration of Ames Street to one lane in each direction under the Ames Street Residences project to provide right-of-way for a two-way cycle track. The elimination of the separate left and right northbound lanes of Ames Street cause the approach to degrade the intersection to an LOS F. With the addition of Project-generated trips, the morning peak hour will experience an increase of 19.0 seconds of delay and continue to operate at a LOS F. The evening peak hour will experience a greater impact due to the project with an increase of 72.1 seconds of delay and will continue to operate at an overall LOS F. The significant increase in delay is due to a high number of Project trips assigned to the Ames Street northbound left movement onto Broadway.

Broadway/Third Street intersection operates at a LOS E during the morning peak hour under 2014 Existing Conditions and degrades to a LOS F under 2024 No-Build Conditions due to increased traffic at the intersection and new traffic patterns from the reconfiguration of the intersection. Under the 2024 Build Conditions, an increase in morning peak hour delay of 17.5 seconds is projected and the intersection will continue to operate at a LOS F. The evening peak hour operates at a LOS D under 2014 Existing Conditions and degrades to a LOS F for the 2024 No-Build and 2024 Build Conditions, with an increase of 24.1 seconds of delay due to Project generated trips passing through the intersection.

Broadway/Main Street operates at a LOS C during the morning peak hour and LOS B during the evening peak hour under 2014 Existing Conditions. Under 2024 No-Build

and Build Conditions, the intersection LOS operations is maintained at LOS C during the morning peak hour and LOS B during the evening peak hour. Under the 2024 Build Condition, the Project will increase delay at the Main Street approach by less than one second during both the morning and evening peak hours.

Broadway/Main Street/Memorial Drive intersection operates at a LOS A for both peak hours under 2014 Existing Conditions. The intersection degrades to an LOS E during the morning peak hour under 2024 No-Build Conditions due to the increased volume on the Broadway/Main Street eastbound approach causing increased delay to the vehicle turning onto Broadway/Main Street from the Memorial Drive Off-Ramp. The evening peak hour slightly increases in delay and the intersection operates at a LOS B under 2024 No-Build Conditions. Under 2024 Build Conditions, the intersection continues to operate at LOS E during the morning peak hour with an increase in delay of 5.4 seconds and LOS B during the evening peak hour with an increase in delay of 0.2 seconds.

Main Street/Ames Street, under 2014 Existing Conditions, operates at a LOS D during the morning peak hour and degrades to a LOS E under 2024 No-Build Conditions. During the evening peak hour the intersection operates at a LOS C under 2014 Existing Conditions and degrades to a LOS D under 2024 No-Build Conditions. The LOS decrease is caused by the reconfiguration of Ames Street to one lane in each direction, causing the Ames Street southbound approach to increase in delay and therefore the overall intersection delay increases. The intersection continues to operate at LOS E and LOS D for the morning and evening peak hours, respectively, under 2024 Build Conditions. The overall intersection delay is only slightly increased under 2024 Build Conditions and the addition of Project trips. The morning peak hour increases by 4.6 seconds and the evening peak hour increases by 0.2 seconds.

Main Street/Galileo Galilei Way/Vassar Street operates at a LOS C during both peak hours under 2014 Existing Conditions. Due to increased traffic at the intersection, under 2024 No-Build Conditions the intersection degrades to an LOS D during the morning peak hour and LOS E during the evening peak hour. The intersection continues to operate at LOS D for the morning peak hour under 2024 Build Conditions with an increase in delay of 7.8 seconds. Project trips added to the intersection increase the approach delays and increase the overall intersection delay by 24.9 seconds and cause the intersection to operate at an LOS F for the evening peak hour under 2024 Build Conditions.

Massachusetts Avenue/Vassar Street intersection operates at a LOS D during the morning peak hour and LOS E during the evening peak hour under 2014 Existing Conditions. Under 2024 No-Build Conditions, with area-wide and specific future development traffic, the intersection degrades to a LOS F during both peak hours. The intersection continues to operate at LOS F under 2024 Build Conditions for the morning and evening peak hours with overall intersection delay increase of 7.8 seconds and 13.4 seconds, respectively.

Memorial Drive/Route 3/Ames Street, under 2014 Existing Conditions, operates at a LOS E during the morning peak hour and LOS F during the evening peak hour. The high volumes on Memorial Drive cause delays for the Ames Street southbound traffic to enter the intersection causing delays. Under 2024 No-Build Conditions volumes along Memorial Drive increase as well as volumes at the Ames Street southbound approach, and this increases delay, causing the morning peak hour to operate at a LOS F. The evening peak hours also experiences increases in delay due to increased traffic and continues to operate at LOS F. Under 2024 Build Conditions the intersection continues to operate at LOS F for both the morning and evening peak hours. Project-generated trips will slightly increase intersection delay by 1.8 seconds during the morning peak hour and slightly decrease intersection delay by 1.6 seconds during the evening peak hour.

Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps intersection operates at an LOS B during the morning peak hour and LOS F during the evening peak hour for all analyzed conditions. With the addition of Project generated trips under 2024 Build Conditions the morning peak hour will experience no delay increases, while the evening peak hour will experience significant delay increases of 50.3 seconds.

Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps operates at a LOS F during both peak hours under 2014 Existing, 2024 No-Build and 2024 Build Conditions. Project-generated trips will increase intersection delay by 1.7 seconds during the morning peak hour and 12.9 seconds during the evening peak hour.

O'Brien Highway/First Street is a new intersection under 2024 No-Build Conditions due to the relocation of the Lechmere MBTA Green Line Station and the O'Brien Highway Improvement Project. The intersection operates at a LOS F under both morning and evening peak hour conditions due to the heavy volumes at the O'Brien Highway approaches. The Project trips passing through this intersection will only slightly increase intersection delay. The morning peak hour delay will increase by 3.4 seconds while the evening peak hour will increase by 0.1 seconds.

In addition to intersection LOS analysis, an intersection queue analysis was performed. Detailed queue tables showing the 50th and 95th percentile queues are presented in Appendix C. Queues are related to the intersection LOS analysis and show the same changes as the LOS operations at each intersection through 2014 Existing Condition, 2024 No-Build Condition, and 2024 Build Condition.

Site Circulation

The proposed Project will include approximately one million square feet of new development to the KSURP area and would add an additional 740 parking spaces. The program, as previously presented, will include a parking and office addition to the Cambridge Center North Garage, demolition of the existing Eleven Cambridge

Center building to be replaced by a residential building with first floor retail and below grade parking, and the demolition of the existing Three Cambridge Center building and a new residential and office building with ground floor retail on the site. In addition, the Whitehead building at Nine Cambridge Center will be adding additional office space to the existing building and BioGen will be converting a previously unused section of their Seventeen Cambridge Center building to usable office space.

The Cambridge Center North Garage will continue to provide access and egress off Broadway and Binney Street using the access roadways, and the new parking garage under Eleven Cambridge Center will use these access roadways for access and egress into the new garage. The proposed office development of the Cambridge Center North Garage expansion will be accessed through street level lobbies on Broadway and Binney Street and through various entrances within the garage.

Eleven Cambridge Center will provide various street level entrances to retail as well as a residential lobby for its residents. Access to and from the garage will be through the building lobby. All parking for Eleven Cambridge Center residents will be accommodated on site at the new underground parking garage with access off of the existing North Garage driveways.

Three Cambridge Center will provide access to the office and residential components though a building lobby and retail access with be through various street level entrances. Parking associated with this Project will be accommodated by the existing Cambridge Center East Garage adjacent to the Project with access off of Ames Street and Binney Street.

Parking Operations

The Project will add up to an additional 740 parking spaces to the KSURP area. Collectively, the approximately 2,667 existing off-street parking spaces and proposed parking supply for the Project Change falls within the maximum off-street parking supply previously approved under Plan Amendment No. 3 (3,545 spaces). All new parking will be structured parking.

Two new levels of parking, 160 spaces each for a total of 320 spaces, will be added to the Cambridge Center North Garage for tenant and visitor parking. The new residential building at Eleven Cambridge Center will provide 320 below-grade parking spaces for building residents. In addition, 100 parking spaces will be provided for the new residential and office building at Three Cambridge Center. Table 2-11 below outlines the future parking within the KSURP area.

Table 2-11 Future Parking Supply in the KSURP Area

Project Component/Garage	Size (Net-New)	Existing Parking	Proposed New Parking for the Project	Future Parking
Cambridge Center North Garage Office Buildings	590,000 GSF	1,136	370	1,506
Cambridge Center West Garage	--	727	0	727
Cambridge Center East Garage	--	804[1]	0	804
Eleven Cambridge Center Residential Building	158,400 GSF	0	370	370
Three Cambridge Center Mixed Use Building	211,100 GSF	0	0	0
Total	**959,500 GSF[2]**	**2,667**	**740**	**3,407**

GSF – gross square feet

1 Accounts for the approximately 40 spaces within the East Garage that will be eliminated as a result of the recently approved Ames Street Residences project.

2 Total GSF related to parking does not match the proposed development program GSF due to the exclusion of the Broad and Whitehead Expansions. Broad and Whitehead employees have been assigned to the existing Cambridge Center West Garage which has capacity to support these smaller expansions.

The additional 740 parking spaces being built with the approximately 1.03 million square feet of new development provides a parking ratio of 0.7 spaces per 1,000 square feet of new development. The City has recommended new zoning requirements under the K2 Plan for parking standards in the area. New office uses have no minimum parking requirement, but instead a maximum parking ratio of 0.9 spaces per 1,000 square feet. And, retail uses have a maximum 0.5 space per 1,000 square feet parking requirement. To be conservative, this analysis assumes the Project builds the maximum allowable parking for office uses. In the K2 Plan, residential development has a minimum of 0.5 spaces per dwelling unit and a maximum ratio of 0.75 spaces per dwelling unit. However, the Proponent is considering reducing the residential parking requirement to 0.25 spaces per dwelling unit based on current trends within the area.

The Cambridge Center North Garage Office Building will provide 0.5 spaces per 1,000 square feet and the current garage occupancy has additional capacity to handle any potential additional demand associate with the office component. The Eleven Cambridge Center Residential Building will provide 1.1 spaces per dwelling unit and will be sharing parking with the retail component of the proposed building. The Three Cambridge Center Mixed Use Building will provide 0.5 spaces per 1,000 square feet of development. Based on a shared parking approach, this parking supply is adequate because multiple uses will have opposite peak parking demand times. The area parking garages will also provide additional parking capacity if demand is above expected for the new development components.

The additional parking proposed as part of the Project is expected be shared parking among employees and residents within the area. Employee parking demand is

usually during the day, opposite of residential parking demand which is usually at night. This shared parking program minimizes the number of parking spaces needed to be built with the development.

Transit Operations

A comprehensive transit analysis was conducted to understand the Projects' impacts on the public transit system within the area. The Project is expected to generate 639 new transit trips (421 entering, 218 exiting) during the morning peak hour and 716 new transit trips (215 entering, 501 exiting) during the evening peak hour as shown in Table 2-12 below.

Table 2-12 Project-Generated Transit Trips

	AM Peak Hour		PM Peak Hour	
Use	In	Out	In	Out
Residential	19	76	76	40
Office	389	133	106	425
Retail	13	9	33	36
Total	421	218	215	501

The most recent data available providing a breakdown of subway and bus public transportation usage is from the 2006-2010 American Community Survey. Data from the study area location shows that approximately 64 percent of employees who use transit will use subway or railway and approximately 36 percent will use bus to commute to work. Data also shows that residents in this area using transit will have a 79/21 percent split between subway and bus services. The distribution is summarized in Table 2-13 below.

Table 2-13 Transit Distribution

Transit	Employees/Retail	Residents
Red Line	64%	79%
EZ-Ride	7%	4%
Route 64	7%	4%
Route 68	7%	4%
Route 85	7%	4%
CT2	8%	5%

Transit distribution is then applied to the Project generated transit trips presented previously in Table 2-11 in order to find the Project-generated trips by line or route. The result is shown in Tables 2-14 and 2-15 below for the morning peak hour and evening peak hour, respectively.

Table 2-14 Morning Peak Hour Project-Generated Transit Trips by Line

	Employees/Retail		Residents		Total	
Transit	In	Out	In	Out	In	Out
Red Line	257	91	15	60	272	151
EZ-Ride	29	10	0	3	29	13
Route 64	29	10	1	3	30	13
Route 68	29	10	1	3	30	13
Route 85	29	10	1	3	30	13
CT2	29	11	1	4	30	15

Table 2-15 Evening Peak Hour Project-Generated Transit Trips by Line

	Employees/Retail		Residents		Total	
Transit	In	Out	In	Out	In	Out
Red Line	89	295	60	32	149	327
EZ-Ride	10	33	3	1	13	34
Route 64	10	33	3	1	13	34
Route 68	10	33	3	2	13	35
Route 85	10	33	3	2	13	35
CT2	10	34	4	2	14	36

The Project transit trips by line or route are then added to the existing route volumes in order to calculate the morning and evening peak hour utilization for each service in the 2024 Build Condition. Entering and exiting trips were proportion onto inbound and outbound trains based on exiting ridership volumes. Table 2-16 below shows the ridership and the volume-to-capacity (v/c) ratio for the MBTA Red Line. All employees, retail patrons and residents taking the subway are assumed to use the Kendall Square Station. The Red Line has a capacity of 167 passengers per car and with six cars per train set at a combined headway of 4.5 minutes, the peak hour capacity in 13,026 persons per hour. The capacity and existing ridership number of the Red Line are based on posed MBTA Red Line schedules and published average hourly weekday ridership data.

Table 2-16 2024 Build Condition MBTA Subway Peak Hour Utilization

		AM Peak					PM Peak				
Segment	Capacity	Existing Ridership	Existing V/C	Project Trips	Build Ridership	Build V/C	Existing Ridership	Existing V/C	Project Trips	Build Ridership	Build V/C
Entering Kendall (inbound)	13,026	9,524	0.73	181	9,705	0.75	4,033	0.31	50	4,083	0.31
Exiting Kendall (Inbound)	13,026	8,514	0.65	111	8,625	0.66	5,469	0.42	125	5,594	0.43
Entering Kendall (outbound)	13,026	4,784	0.37	91	4,875	0.37	8,094	0.62	99	8,193	0.63
Exiting Kendall (outbound)	13,026	3,120	0.24	40	3,160	0.24	8,821	0.68	202	9,023	0.69

Source: MBTA Average Weekday Ridership 2013

In addition to Table 2-16 above, Figure 2-15 shows the daily activity at the Kendall/MIT Station. Existing ridership volumes from the MBTA Average Weekday Ridership 2013 were used and grown by ten percent to account for future ridership growth. The daily Project trips for employee/retail and residential were broken up into directional (Inbound and Outbound) boardings and alightings using the distribution of existing trips throughout the day. These trips were added to the existing hourly volumes in order to show the estimated number of future riders under the 2024 Build Condition. The chart shows that the Project will increase activity at the station by 14 percent inbound and 6 percent outbound during the morning peak hour and 8 percent inbound and 15 percent outbound during the evening peak hour. Overall the Kendall/MIT Station platform activity will increase by approximately 9 percent. However, it is expected that the increase in volume will be accommodated within the physical capacity of the station.

The Red Line's hourly ridership under the 2024 Build Condition is shown in Figure 2-16. The section of the Red Line chosen for this analysis is between Charles MGH Station and Kendall/MIT Station since it carries the highest number of existing riders and Project generated transit trips. The Project generated trips that travel though this section in the outbound and inbound directions are added to the future hourly ridership in order to calculate the total Build hourly ridership. Overall ridership will increase by approximately one percent with the addition of the Project trips. During the morning peak hour, ridership is estimated to increase by one percent for inbound trips and two percent for outbound trips. Ridership during the evening peak hour is projected to increase by two percent for inbound trips and one percent for outbound trips. The capacity and existing ridership numbers are based on the posed MBTA Red Line schedule and published weekday hourly ridership numbers. Based on the available data, the Red Line will be able to support the Project generated trips with the full utilization of the peak hours.

It is important to note that this analysis does not take into account the "peak of the peak" experience which many times operates at a v/c ratio of over capacity. This

analysis is based on the assumption of minimum allowable headways according to the posted MBTA Red Line schedule. Often times this is not the case and trains are bunched together due to outdated infrastructure causing overcrowding and unpleasant riding conditions. Upgrades to the transit infrastructure would help the Red Line maintain the planned schedule, reduce overcrowding and improve reliability. Mitigation for transit improvements is discussed later in this chapter as well as in Chapter 9.

Table 2-17 below shows the build ridership and volume-to-capacity ratio for the MBTA bus routes. For this analysis, a bus capacity of 60 passengers was used.

Table 2-17 2024 Build Condition MBTA Bus Route Peak Hour Utilization

Route & Direction	Frequency (buses per hour)	Capacity	AM Peak					PM Peak				
			Existing Ridership	Existing V/C	Project Trips	Build Ridership	Build V/C	Existing Ridership	Existing V/C	Project Trips	Build Ridership	Build V/C
64												
Inbound	3	180	177	0.98	30	207	**1.15**	48	0.27	13	61	0.34
Outbound	3	180	56	0.31	13	69	0.38	90	0.50	34	124	0.69
68												
Inbound	2	120	40	0.33	30	70	0.58	29	0.24	13	42	0.35
Outbound	2	120	21	0.18	13	34	0.28	29	0.24	35	64	0.53
85												
Inbound	2	120	98	0.82	30	128	**1.07**	11	0.09	13	24	0.20
Outbound	2	120	4	0.03	13	17	0.14	56	0.47	35	91	0.76
CT2												
Inbound	3	180	211	**1.17**	30	241	**1.34**	207	**1.15**	14	221	**1.23**
Outbound	3	180	166	0.92	15	181	**1.01**	156	0.87	36	192	**1.07**

Source: MBTA Fall 2012 APC data

Many of the bus routes within the KSURP area experience high v/c ratios and are operating at or around full capacity under existing conditions. These routes include 64 Inbound, 85 Inbound and CT2 Inbound and Outbound during the morning peak hour and routes CT2 Inbound and Outbound during the evening peak hour. Under 2024 Build Conditions, with the Project trips added to the ridership, v/c ratios increase. The routes already experiencing close to capacity ridership will be operating over capacity with the addition of the Project trips. These routes include 64 Inbound (AM), 85 Inbound (AM) and CT2 Outbound (AM and PM). All bus routes operating at or above full capacity are bolded.

Bicycle and Pedestrian Operations

The KSURP area is well served by bicycle and pedestrian infrastructure. As seen in the previously presented Bicycle Facilities figure, Figure 2.7, the area has extensive bike lanes and cycle tracks which provide save accommodations for cyclists. The proposed Project is expected to generate 1,184 daily bicycle trips, 165 AM peak hour trips and 185 PM peak hour trips. Under the City's Bicycle Parking Guidelines the proposed development will provide 802 long term bicycle parking spaces and 142 short term bicycle spaces. Table 2-18 below breaks down each buildings bicycle parking minimum requirements.

Table 2-18 Bicycle Parking Minimum Requirements

			Long Term		Short Term	
Project Component	Land Use	Building Unit[1]	Rate	Spaces	Rate	Spaces
Cambridge Center North Garage	Office	590,000	0.30 per 1,000 sf	177	0.06 per 1,000 sf	35
Office Buildings						
Eleven Cambridge Center	Residential	294	1.05 per dwelling	309	0.10 per dwelling	29
Residential Building	Retail	25,000	0.10 per 1,000 sf	3	1.00 per 1,000 sf	25
Three Cambridge Center Mixed	Residential	266	1.05 per dwelling	279	0.10 per dwelling	27
Use Building	Office	106,200	0.30 per 1,000 sf	32	0.06 per 1,000 sf	6
	Retail	20,000	0.10 per 1,000 sf	2	1.00 per 1,000 sf	20
Total		**1,034,600 sf**		**802**		**142**

sf square feet
1 Office land use unit - building square footage; Residential land use unit – dwelling

These spaces will be accommodated using existing available bicycle parking facilities and new facilities at or near the development sites.

A significant number of walking trips will be generated by the Project, including an estimated 1,544 daily trips, 169 AM peak hour trips and 195 PM peak hour trips. All study area roadways provide sidewalks which are in good condition. All study area intersections provide crosswalks along at least two perpendicular approaches for pedestrians to safely cross the intersection.

There are many current and planned project in the area focused on improving pedestrian and bicycle accommodations. These projects are listed and described below.

Ames Street Residences is a residential project in the KSURP area located at 88 Ames Street next to the Cambridge Center East Garage. The project will reconstruct Ames Street to provide a two-way cycle track and a new sidewalk on the east side of the roadway.

Alexandria Center at Kendall Square is a mixed-use, multi-building development project with building fronting Binney Street from Third Street to First Street. The project is reconstructing Binney Street from Third Street to Land Boulevard,

reconstructing the sidewalk and installing a one-way elevated cycle track on each side of the roadway. The cycle track will connect to a proposed cycle track along Binney Street to the west of Third Street. This latter section of the cycle track is being constructed by the City. The project has also installed a new crosswalk along the southern approach of the Binney Street and Land Boulevard intersection and implemented concurrent pedestrian crossings at the intersection.

Main Street Reconstruction will redesign Main Street from Ames Street to the Longfellow Bridge. This project includes the realignment of Main Street to the Broadway/Third Street intersection as discussed in the Roadway Improvements Section under Future No-Build Conditions. New sidewalks and streetscape will be included in the reconstruction as well as updates to the mid-block crossing between the Kendall Square MBTA Red Line Stations. The mid-block crossing between the headhouses will become a large raised crosswalk for a safer pedestrian crossing and slower vehicular speeds through the area. The plans also propose to eliminate the median running the length of Main Street from Broadway to Ames Street. A new crosswalk with a pedestrian warning signal is proposed across Broadway/Main Street just west of the Longfellow Bridge.

Grand Junction Multi-Use Path is a proposed multi-use connection for pedestrians and bicyclists that would run alongside the existing Grand Junction railroad tracks. The path would run from the Boston University Bridge along the western edge of the KSURP area and connect to the planned extension of the Somerville Community Path.

Loading and Service

Loading and service to a portion of the Project, including Nine Cambridge Center (Whitehead), Broad and Three Cambridge Center will use existing facilities. Eleven Cambridge Center loading docks will be located and designed similar to the existing loading docks at the current Eleven Cambridge Center. Cambridge Center North Garage will use existing infrastructure within the area to accommodate loading and service to the new office component. The loading and service details will be incorporate into the design of the buildings and a designated transportation coordinator will oversee all loading and service operations.

Proposed Transportation Mitigation and Other Beneficial Measures

As indicated in the above analyses, the Project will have limited impacts to the surrounding transportation infrastructure. The Proponent will work with all stakeholders, including MassDOT, MBTA and the City to understand these impacts and establish a plan for mitigation and improvements to various transportation infrastructures. MassDOT has recently established a Kendall Square Mobility Task Force (the "Task Force") to study the Kendall Square area, identify mobility issues for

all modes of transportation and recommended possible solution. The Proponent is in full support of the Task Force and will use the outcomes of the study to help shape the mitigation plan for the Project. The following sections describe various aspect of the proposed mitigation to be discussed in further detail with all stakeholders.

Public Transportation Improvements

The City established a Transit Advisory Committee in May of 2013 to help identify, plan, and provide support to the public transportation problems within the City. The committee published the Cambridge Transit Strategic Plan to identify the current conditions of public transportation in the City and established seven unique goals to help improve the system and provide better services to the residents, businesses and visitors of the City. These goals, listed below, align with the Proponents vision for the KSURP area.

- Mobility
- Funding
- Efficiency and Reliability
- Expansion
- Usability, Accessibility, and Safety
- Public Participation, Support, and Outreach
- Resiliency

The Proponent is currently discussing these goals and future vision of public transportation in the KSURP area with stakeholders, including the MBTA and the City. The Proponent will also consider the outcomes of the MassDOT Task Force mobility study when discussing appropriate public transportation improvements. The process will ultimately lead to a plan, agreed upon by all involved parties, of mitigation measures the Proponent will implement to improve the public transportation infrastructure and experience within the KSURP area.

Enhanced Transit Mitigation Program

The Proponent and the Redeveloper remain focused, , as they have throughout the development of Cambridge 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 area. It is acknowledged and well documented that 70 percent of 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 Proponent's plans for expansion of the KSURP.

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation projected to result from the Project. The ETMP will be developed in conjunction with the many stakeholders engaged in transportation planning and operations in Kendall Square, including the Task Force, the MBTA, and MassDOT. The ETMP would supplement the proposed transportation mitigation measures outlined in this NPC.

The Proponent and Redeveloper have engaged in preliminary discussions with MassDOT and the MBTA to discuss 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 ETMP program. The ETMP would be designed to enhance access to and mobility around Kendall Square, which the Proponent believes is critical to the long-term economic success of the area. It is expected that the ETMP will be focused on major transportation initiatives that will improve transit options 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 ETMP would focus on enhancements to transit and other non-single occupancy vehicle transportation alternatives. 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 Proponent recognizes that the development of the ETMP will require detailed consideration and analysis of the enhancement alternatives, as well as careful coordination with the stakeholders and service providers. As stated above, the Proponent believes that this analysis can be undertaken in conjunction with the Task Force. 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 Proponent, in coordination with the City, will work with Mass DOT and the MBTA to develop the elements of the ETMP, which can be refined supplemented over time as the Task Force completes it work.

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

Over the coming months, the Proponent will be working closely with the City, the MBTA and MassDOT to develop and refine the ETMP proposal, including additional details on the potential source of these funds and the range of transit mitigation projects and program options for consideration, including:

- **Kendall Square Transit Enhancements** - Other options and services to be explored, including capital and service investments to develop new transit services on the Grand Junction railroad corridor on the western edge of Kendall Square, as previously proposed;
- **MBTA Red Line Kendall Station Improvements** - Enhancements to station access (incorporating ADA compliance), improvements to station communication systems, platform improvements, MBTA passenger experience enhancements, resilience enhancement measures;
- **MBTA Kendall Station / Kendall Square Connections** - Improved connections to MBTA Orange Line and Green Line Service, utilized by Kendall Square workers during peak AM and PM hours, provision of coordinated shuttle bus and other services on a scheduled and long-term basis, other potential bus access, comfort and related service improvements; and
- **MBTA Red Line Service Improvements** - Measures to improve service frequency and reliability and/or capacity, including potential MBTA signal improvements, to be developed in close coordination with and integrated into short-term and long-term MBTA capital planning.

Vehicular Access and Circulation Improvements

The LOS analysis performed at the study area intersections indicate that there are intersections where improvements could be made to reduce vehicle delay and enhance the overall intersection operations. These intersections have been studied from a vehicular operations standpoint and possible improvements have been suggested below. These suggested improvements will be discussed in detail with all stakeholders in the broader context of other proposed improvements. The final design and implementation of any vehicular access and circulation improvements associated with the Project will be agreed upon by all involved parties.

The Proponent understands that other users including pedestrian and bicyclist use these intersections and any improvements made need to consider the safety of all users. Therefore, additional studies may need to be done to ensure improvements at study area intersections have considered all user groups and maintained or improved safety and operations for all. The intersections studied for the purposes of this mitigation analysis are summarized below and discussed in further detail in the following sections.

- **Cambridge Street/Third Street** – PM signal optimization;
- **Broadway/Galileo Galilei Way** – Signal optimization with permitted left turns;

- **Main Street/Vassar Street/Galileo Galilei Way** – Protected east/west left turn phase and signal optimization;
- **Memorial Drive/Route 3/Ames Street** – Additional right-turn only lane on Ames Street; and
- **Massachusetts Avenue/Memorial Drive Off-Ramps** – Signal optimization with right-turn on red.

The proposed mitigation at each of the intersections is documented and a 2024 Build Mitigated Level of Service analysis was performed to quantify the improved traffic operations at these intersections. The proposed vehicular improvements to particular intersection timings and phasing will maintain current cycle times as to not greatly impact pedestrian wait times at these intersections. All intersections with proposed mitigation will continue to provide adequate walk time for pedestrians of all abilities to safely cross the intersection. The Proponent will work with the City to determine the specific vehicular access and circulation improvements to be made within the study area. The goal of any intersection improvements will be to provide a balanced design and insure signal timings are equitable for all uses or modes of travel.

Cambridge Street/Third Street

Cambridge Street/Third Street operates at a LOS C during the morning peak hour and LOS D during evening peak hour under 2014 Existing Conditions. The increased traffic from 10 years of background growth and traffic due to planned development projects in the area degrade intersection operations to LOS F during both peak hours under 2024 No-Build Conditions. The intersection continues to operate at LOS F during both peak hours under 2024 Build Conditions, when the proposed Project traffic is added to the network. Due to the large increase in traffic entering this intersection in future conditions, signal timings should be adjusted to better accommodate these new volumes and travel patterns. Signal timing adjustments for the evening peak hour presented significant delay improvements, while morning peak hour signal adjustment showed no improvement and therefore only evening timing optimization should be implemented. The results of the evening signal optimization is shown in Table 2-19 below.

Table 2-19 Cambridge Street/Third Street Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition			2024 No-Build Condition			2024 Build Condition			2024 Build Mitigate Condition		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
PM	Cambridge Street EB thru	1.02	79.8	E	1.72	367.4	F	1.72	365.2	F	1.26	161.5	F
	Cambridge Street WB thru	1.04	96.5	F	1.55	287.1	F	1.58	301.2	F	1.30	175.3	F
	Third Street NB thru	0.80	7.7	A	1.04	33.2	C	1.11	60.1	E	1.30	151.5	F
	Third Street SB left	0.13	2.0	A	0.18	15.7	B	0.19	16.0	B	0.27	22.0	C
	Third Street SB thru	0.52	5.2	A	0.51	19.4	B	0.53	19.9	B	0.63	26.5	C
	Overall	**0.90**	**44.8**	**D**	**1.32**	**186.0**	**F**	**1.36**	**193.9**	**F**	**1.30**	**138.5**	**F**

Signal optimization for the evening peak hour reduces the overall intersection delay by approximately 50 seconds. The timing adjustments made were to better accommodate the Cambridge Street eastbound and westbound approaches, which reduced those respective approach delays. In better accommodating the Cambridge Street movements, the Third Street delays increase modestly. Although there is a significant increase in the Third Street northbound approach, the delay at the intersection is more evenly distributed creating a better overall intersection operation. Although the intersection still operates at an LOS F under the evening peak hour conditions the overall delay is reduced by almost 50 seconds.

Broadway/Galileo Galilei Way

Broadway/Galileo Galilei Way operates at a LOS F under current conditions and all future conditions studied during both the morning and evening peak hours. This is due to high volumes, particularly turning volumes, on Broadway and Galileo Galilei Way. Mitigation measures should be considered to reduce the overall delays experienced at this intersection. Restriping Galileo Galilei Way southbound to provide a through/right lane instead of an exclusive right lane allows for better flow through the intersection and does not greatly impact southbound right turns as there is no right on red designation at the intersection. In addition to the left turn protected phases, left turns should be permitted during through movements, allowing increased left turns to be made during gaps in opposing traffic. The morning and evening signal timings should be optimized to better accommodate the increase in traffic at the intersection. Table 2-20 below shows the operational improvements these mitigation measures have at the intersection.

Table 2-20 Broadway/Galileo Galilei Way Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition v/c	2014 Existing Condition Delay	2014 Existing Condition LOS	2024 No-Build Condition v/c	2024 No-Build Condition Delay	2024 No-Build Condition LOS	2024 Build Condition v/c	2024 Build Condition Delay	2024 Build Condition LOS	2024 Build Mitigate Condition v/c	2024 Build Mitigate Condition Delay	2024 Build Mitigate Condition LOS
	Broadway EB left	0.84	41.6	D	1.27	164.6	F	1.38	211.2	F	0.83	24.1	C
	Broadway EB thru	1.16	114.2	F	1.25	153.2	F	1.27	160.8	F	1.18	114.3	F
	Broadway EB right	0.43	34.2	C	0.42	32.6	C	0.42	32.7	C	0.38	26.9	C
	Broadway WB left	1.33	234.9	F	1.42	247.7	F	1.75	387.6	F	0.72	34.1	C
	Broadway WB thru	0.94	69.5	E	0.98	67.6	E	1.01	70.1	E	0.84	33.5	C
AM	Galileo Galilei Way NB left	0.87	90.8	F	0.91	83.6	F	0.92	81.4	F	0.54	25.1	C
	Galileo Galilei Way NB thru	0.45	27.3	C	0.72	33.5	C	0.78	34.5	C	0.77	32.2	C
	Galileo Galilei Way SB left	0.86	46.6	D	0.93	52.1	D	0.95	44.2	D	0.46	25.5	C
	Galileo Galilei Way SB thru	0.92	47.6	D	1.49	270.0	F	1.49	247.0	F	1.34	196.2	F
	Galileo Galilei Way SB right	1.72	353.6	F	2.14	543.9	F	2.14	563.4	F	--	--	--
	Overall	**1.30**	**104.6**	**F**	**1.68**	**185.1**	**F**	**1.69**	**191.4**	**F**	**1.15**	**95.0**	**F**
	Broadway EB left	1.44	237.2	F	2.28	616.2	F	2.37	657.6	F	1.45	243.1	F
	Broadway EB thru	1.17	105.7	F	1.25	141.8	F	1.26	146.9	F	1.13	113.3	F
	Broadway EB right	0.43	24.4	C	0.46	25.0	C	0.46	25.1	C	0.41	29.6	C
	Broadway WB left	0.98	64.4	E	1.58	292.1	F	2.60	750.5	F	1.39	227.6	F
	Broadway WB thru	0.88	47.9	D	1.07	71.9	E	1.12	94.3	F	1.03	73.2	E
PM	Galileo Galilei Way NB left	1.15	158.7	F	1.26	178.4	F	1.31	190.9	F	1.00	81.6	F
	Galileo Galilei Way NB thru	0.76	28.4	C	0.91	30.1	C	0.95	29.6	C	0.83	35.6	D
	Galileo Galilei Way SB left	0.78	76.3	E	0.80	62.3	E	0.80	51.3	D	0.43	21.2	C
	Galileo Galilei Way SB thru	0.79	26.8	C	1.13	76.4	E	1.13	118.7	F	1.13	105.9	F
	Galileo Galilei Way SB right	1.40	247.8	F	3.29	1068.5	F	3.29	1075.2	F	--	--	--
	Overall	**1.23**	**96.2**	**F**	**1.69**	**239.5**	**F**	**1.70**	**287.7**	**F**	**1.27**	**106.2**	**F**

Although the intersection continues to operate at s LOS F under both peak hours in the future, significant decreases in overall delay can be achieved when the mitigation measures are implemented. All left turning movements improve when permitted left turns are allowed and signal timings are adjusted. The southbound approach also greatly improves under mitigated conditions.

Main Street/Galileo Galilei Way/Vassar Street

Main Street/Galileo Galilei Way/Vassar Street operates at LOS C under 2014 Existing Conditions but decreases to LOS E during 2024 No-Build Conditions and LOS F during 2024 Build Conditions. This is due to the high volumes, particularly the left turn volume on Main Street to Galileo Galilei Way and the thru volume on Vassar Street to Galileo Galilei Way. Phasing and signal timing adjustments can be made to reduce the delay in future conditions. A protected left turn phase has been implemented for the Main Street east and westbound movements. During the new

protected left phase, Galileo Galilei Way right turn movement will also receive a protected right turn. The new phasing will require retiming of the signal, but still operate with a 90 second cycle length. The mitigation results are shown in Table 2-21 below.

Table 2-21 Main Street/Galileo Galilei Way/Vassar Street Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition			2024 No-Build Condition			2024 Build Condition			2024 Build Mitigate Condition		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
AM	Main Street EB left	0.39	20.8	C	0.83	43.9	D	0.99	72.9	E	0.75	28.5	C
	Main Street EB thru	0.42	19.8	B	0.49	21.2	C	0.50	21.3	C	0.57	25.8	C
	Main Street WB left	0.27	27.4	C	0.32	25.1	C	0.34	25.2	C	0.32	29.6	C
	Main Street WB thru	0.34	35.8	D	0.40	26.1	C	0.41	26.0	C	0.56	37.3	D
	Vassar Street NB thru	0.50	22.9	C	0.66	26.9	C	0.69	27.9	C	0.89	45.9	D
	Galileo Galilei Way SB left	0.13	21.7	C	0.16	20.8	C	0.16	21.3	C	0.20	31.0	C
	Galileo Galilei Way SB thru	0.58	23.2	C	0.74	24.1	C	0.17	25.3	C	0.90	35.7	D
	Galileo Galilei Way SB right	0.76	27.3	C	1.14	92.1	F	1.18	110.4	F	0.97	28.5	C
	Overall	**0.58**	**23.9**	**C**	**0.98**	**40.0**	**D**	**1.08**	**47.8**	**D**	**0.91**	**34.3**	**C**
PM	Main Street EB left	0.61	24.6	C	0.98	64.8	E	1.05	84.2	F	1.02	74.3	E
	Main Street EB thru	0.41	17.7	B	0.48	18.8	B	0.48	18.9	B	0.73	36.3	D
	Main Street WB left	0.22	18.8	B	0.27	26.3	C	0.27	26.1	C	0.35	36.5	D
	Main Street WB thru	0.24	18.2	B	0.28	25.8	C	0.28	25.5	C	0.54	42.6	D
	Vassar Street NB thru	0.80	34.4	C	1.09	89.0	F	1.19	127.7	F	0.96	48.6	D
	Galileo Galilei Way SB left	0.21	30.4	C	0.28	31.5	C	0.30	30.6	C	0.23	20.5	C
	Galileo Galilei Way SB thru	0.55	36.5	D	0.77	39.0	D	0.86	40.0	D	0.74	29.7	C
	Galileo Galilei Way SB right	0.70	44.0	D	1.01	58.3	E	1.19	130.7	F	0.79	28.5	C
	Overall	**0.69**	**30.4**	**C**	**1.03**	**56.0**	**E**	**1.11**	**80.9**	**F**	**1.03**	**43.3**	**D**

New phasing and signal timing adjustments will improve the overall operations at the Main Street and Galileo Galilei Way/Vassar Street intersection. The new phasing provides a protected left turn for Main Street east and west movements as well as a protected right turn from Galileo Galilei Way southbound. These movements were operating at LOS E and F's under Build Conditions and after mitigation operate at LOS E, D, and C's. Overall during the morning peak hour the intersection improves from a LOS D under Build Conditions to LOS C under Build Mitigate Conditions. For the evening peak hour, the intersection drastically improves from a LOS F under Build Conditions to LOS D under Build Mitigate Conditions, almost cutting the delay time in half.

Memorial Drive/Route 3/Ames Street

Memorial Drive/Route 3/Ames Street, under 2014 Existing Conditions operates at a LOS E during the morning peak hour and LOS F during the evening peak hour. The high volumes on Memorial Drive cause delays for the Ames Street southbound traffic to enter the intersection causing delays. Under 2024 No-Build Conditions, volumes along Memorial Drive increase as well as volumes at the Ames Street southbound approach and cause delays to increase and the morning peak hour to operate at an LOS F. The evening peak hours also experiences increases in delay due to increase traffic and continues to operate at LOS F. Under 2024 Build Conditions the intersection continues to operate at LOS F for both the morning and evening peak hours. To reduce delays at this intersection, the Ames Street southbound approach should be widen to accommodate two lanes of traffic, an exclusive right lane and a through lane. This would allow for vehicles trying to travel through the intersection, across two lanes of traffic, to be separated from the right turning vehicles. In order to provide two lanes of traffic at the approach some metered parking would have to be eliminated on the west side of Ames Street. The results of this improvement are shown in Table 2-22.

Table 2-22 Memorial Drive/Route 3/Ames Street Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition			2024 No-Build Condition			2024 Build Condition			2024 Build Mitigated Condition		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
AM	Ames Street SB thru	0.60	38.2	E	0.83	75.4	F	0.84	77.2	F	0.67	49.1	E
PM	Ames Street SB thru	1.31	193.6	F	1.81	410.5	F	1.80	408.9	F	1.35	197.1	F

With the addition of a second lane at the Ames Street southbound approach the morning peak hour improves from LOS F to LOS E. The evening peak hour continues to operate at LOS F, but there is an approximately 200 second reduction in delay at the approach. The addition of the second approach lane allows right turning vehicles to avoid waiting for vehicles wanting to travel across Memorial Drive. The through movement causes much of the delay at this approach, as a vehicle has to cross two lanes of traffic on a roadway were speeds can reach 40 to 50 miles per hour.

Another option, not explored in this analysis, but highly effective, would be to eliminate the southbound through movement and have Ames Street be a right turn only onto Memorial Drive westbound.

This suggested mitigation strategy focusses on the vehicular operation at the intersection. Other important factors such as pedestrian safety and bicycle accommodations should be considered. The Proponent understands the need to improve this intersection for all users and will actively participate in current and future discussions about improvements to the intersection. It is important to the proponent that all users are safely accommodated at the Memorial Drive/Route 3 and Ames Street intersection.

Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps and Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps

Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps operates at a LOS F during both peak hours under 2014 Existing, 2024 No-Build and 2024 Build Conditions. This intersection operates as a clustered intersection with Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps less than 100 feet to the north. In optimizing the signal timings at these intersections and allow the Memorial Drive off-ramps to make right-turns-on-red will drastically reduce delays and increase operations at these intersections. The results of the signal optimization are shown in Tables 2-23 and 2-24 below.

Table 2-23 Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition			2024 No-Build Condition			2024 Build Condition			2024 Build Mitigated Condition		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
AM	Memorial Drive WB thru	0.73	56.2	E	0.90	82.8	F	0.41	30.8	C	0.13	43.7	D
	Massachusetts Avenue NB left	0.41	2.1	A	0.48	5.6	A	0.53	8.7	A	0.28	1.2	A
	Massachusetts Avenue NB thru	0.53	1.5	A	0.66	1.8	A	0.70	2.1	A	0.51	0.9	A
	Massachusetts Avenue SB thru	0.60	27.1	C	0.68	26.1	C	0.74	28.3	C	0.60	17.1	B
	OVERALL	**0.49**	**15.6**	**B**	**0.59**	**17.1**	**B**	**0.59**	**14.3**	**B**	**0.50**	**10.1**	**B**
PM	Memorial Drive WB thru	0.40	25.3	C	0.42	25.0	C	0.42	25.0	C	0.15	39.1	D
	Massachusetts Avenue NB left	0.37	15.8	B	0.40	16.9	B	0.40	17.0	B	0.59	34.9	C
	Massachusetts Avenue NB thru	0.80	5.1	A	0.91	6.5	A	0.92	6.9	A	0.54	1.7	A
	Massachusetts Avenue SB thru	2.39	661.7	F	3.04	950.7	F	3.24	1039.1	F	0.93	32.0	C
	OVERALL	**0.71**	**294.7**	**F**	**0.82**	**453.8**	**F**	**0.86**	**504.1**	**F**	**0.56**	**21.4**	**C**

Table 2-24 Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps Mitigation Level of Service

Peak Hour	Lane Group	2014 Existing Condition			2024 No-Build Condition			2024 Build Condition			2024 Build Mitigated Condition		
		v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS	v/c	Delay	LOS
AM	Memorial Drive EB thru	1.83	435.0	F	1.90	466.1	F	0.88	52.9	D	0.32	45.4	D
	Massachusetts Avenue NB thru	0.91	31.1	C	1.15	95.9	F	1.21	125.3	F	0.87	16.7	B
	Massachusetts Avenue SB thru	0.55	1.7	A	0.61	1.9	A	0.66	2.4	A	0.54	1.5	A
	OVERALL	**0.90**	**84.0**	**F**	**1.07**	**119.9**	**F**	**1.06**	**82.3**	**F**	**0.79**	**16.3**	**B**
PM	Memorial Drive EB thru	0.88	45.5	D	0.89	46.5	D	0.89	46.5	D	0.73	54.3	D
	Massachusetts Avenue NB thru	1.53	277.3	F	1.69	352.0	F	1.71	358.9	F	0.97	39.0	D
	Massachusetts Avenue SB thru	2.17	542.9	F	2.76	809.3	F	2.81	832.0	F	0.82	3.9	A
	OVERALL	**1.04**	**315.6**	**F**	**1.16**	**455.8**	**F**	**1.17**	**468.7**	**F**	**0.76**	**29.5**	**C**

The small improvements made at this intersection result in drastic delay and LOS improvements. Allowing the Memorial Drive off-ramps to turn right on red allows the intersection to process these movements without having to allocate much cycle time to the movements as in the Build Conditions. More cycle time can be dedicated to the Massachusetts Avenue north and southbound movements. At the Memorial Drive/Massachusetts Avenue Bridge the signal timing adjustments reduce the northbound LOS from LOS F to LOS B during the morning peak hour and LOS F to LOS D during the evening peak hour. The Memorial Drive/Massachusetts Avenue intersection shows significant improvement at the southbound approach with signal timing adjustments. During the morning peak hour the LOS improves from LOS C to LOS B and in the evening peak hour from LOS F to LOS C. Overall the intersection cluster improves from an overall LOS F/B to LOS B/B during the morning peak hour and LOS F/F to LOS C/C during the evening peak hour by implementing these minor mitigation measures.

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 KSURP area have pedestrian countdown timers with such technology.

The Project is 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 Proponent will work 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 Cambridge Center North Garage Office Buildings 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 for the implementation of a HAWK system.
- Review all pedestrian crossings within the KSURP boundaries to assess their potential for 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 connection to buildings within the KSURP area.
- Support roadway and streetscape improvements along Galileo Galilei Way between Binney and Main Streets.

Bicycle Facilities

As discussed previously, the KSURP area is well serviced by bicycle facilities, including on-street bike lanes, cycle tracks, and multi-use pathways. As shown in Figure 2.6, the City and other improvement projects will further add to the bicycle infrastructure in the area.

The Proponent is committed to enhancing bicycle infrastructure at each Project Component and within the KSURP area by connecting this infrastructure with other area-wide improvements. The Proponent will discuss with the City the possibility of contributing to the proposed infrastructure improvements within the area, including the cycle track along Galileo Galilei Way and the Grand Junction Multi-Use Path. Additionally, in close coordination with the City, the Redeveloper, and Other Developers, the Proponent will also explore opportunities to create a full service bike station within the area.

The Project will provide approximately 800 long-term bicycle spaces and 142 short-term bicycle spaces, in accordance with the City's bike storage requirements. The long-term secure bicycle spaces will be distributed between the Cambridge Center North Garage, Cambridge Center West Garage, Cambridge Center East Garage, Eleven Cambridge Center garage and Three Cambridge Center. Short-term outdoor spaces will be distributed around the KSURP area, focusing on areas around the Project Component sites.

Transportation Demand Management Measures

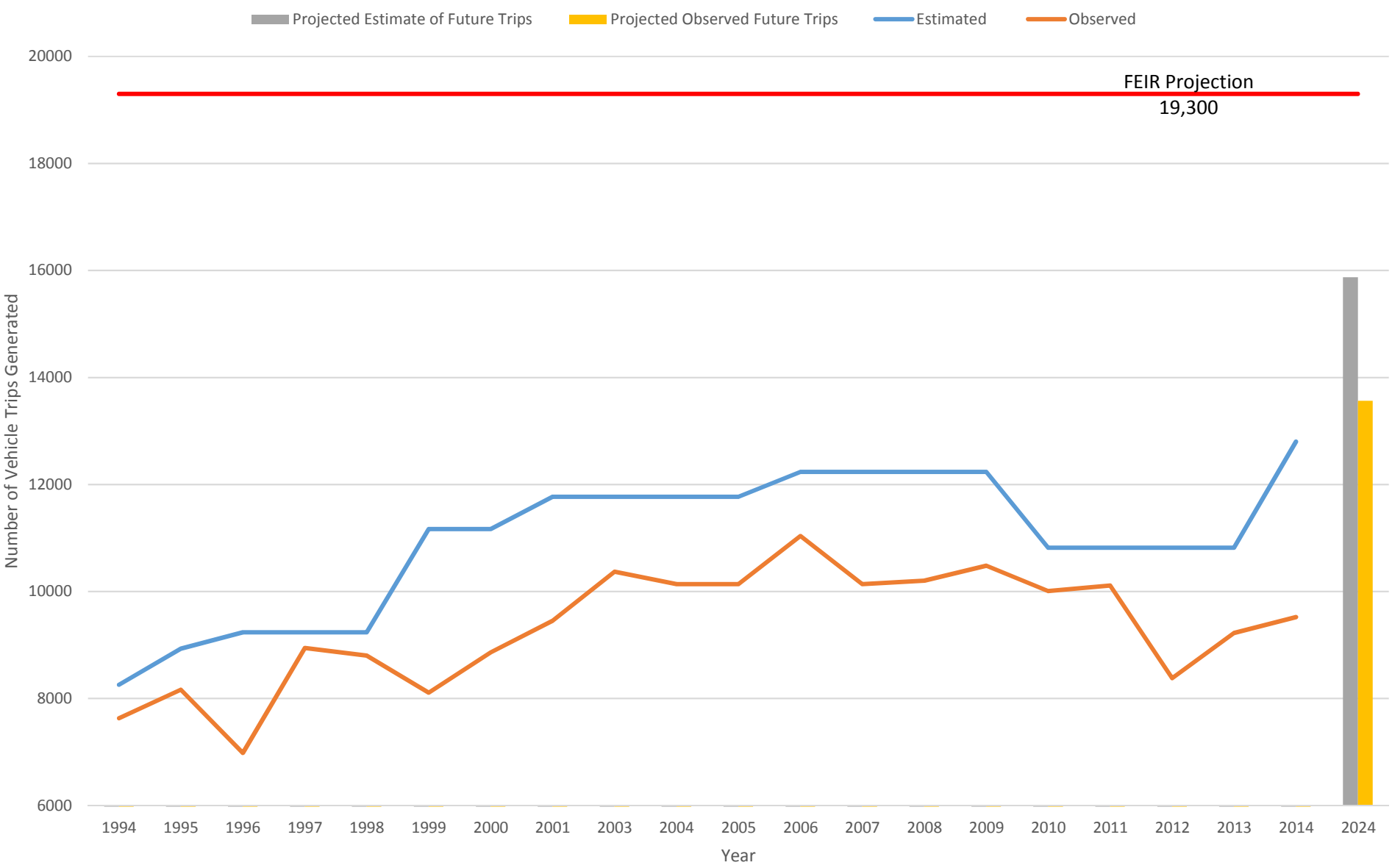
The proposed TDM measures aim to reduce drive-alone trips, or single occupancy vehicles (SOVs), by encouraging employees, residents and visitors to use alternative modes of transportation. The proposed TDM plan for the Project includes consideration of enhanced TDM measures outlined in the K2 Final Report 2013, where applicable and feasible as well as Project-specific measures. 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 will be implemented as part of the Project:

- Appropriate pricing of parking – market rate paid by employees.
- 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 a transit subsidy (exact terms to be based on City coordination).
- Provide free access to EZRide shuttle to Lechmere and North Station.
- Provide adequate bicycle parking and benefits including Hubway availability and possible membership subsidy.
- Determine the feasibility of implementing or sponsoring a car-sharing program, such as ZipCar®.
- Provide designated car-share parking spaces within and/or nearby Cambridge Center parking garages to the car-share business, if deemed feasible.
- 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 Two Cambridge Center, and One and Three Cambridge Center on Parcel 4.
- Continue to participate in the Charles River TMA.

Traffic Monitoring Program

The KSURP area currently has a traffic monitoring program established by MEPA for Plan Amendment No. 3 in 1994. An annual report is issued discussing the daily vehicle volumes, trip generation rates, estimated development generated trips and garage occupancy counts. The KSURP monitoring program and annual report will continue as part of the Project with adjustments to the format of the report to be made in conjunction with MEPA and the City.



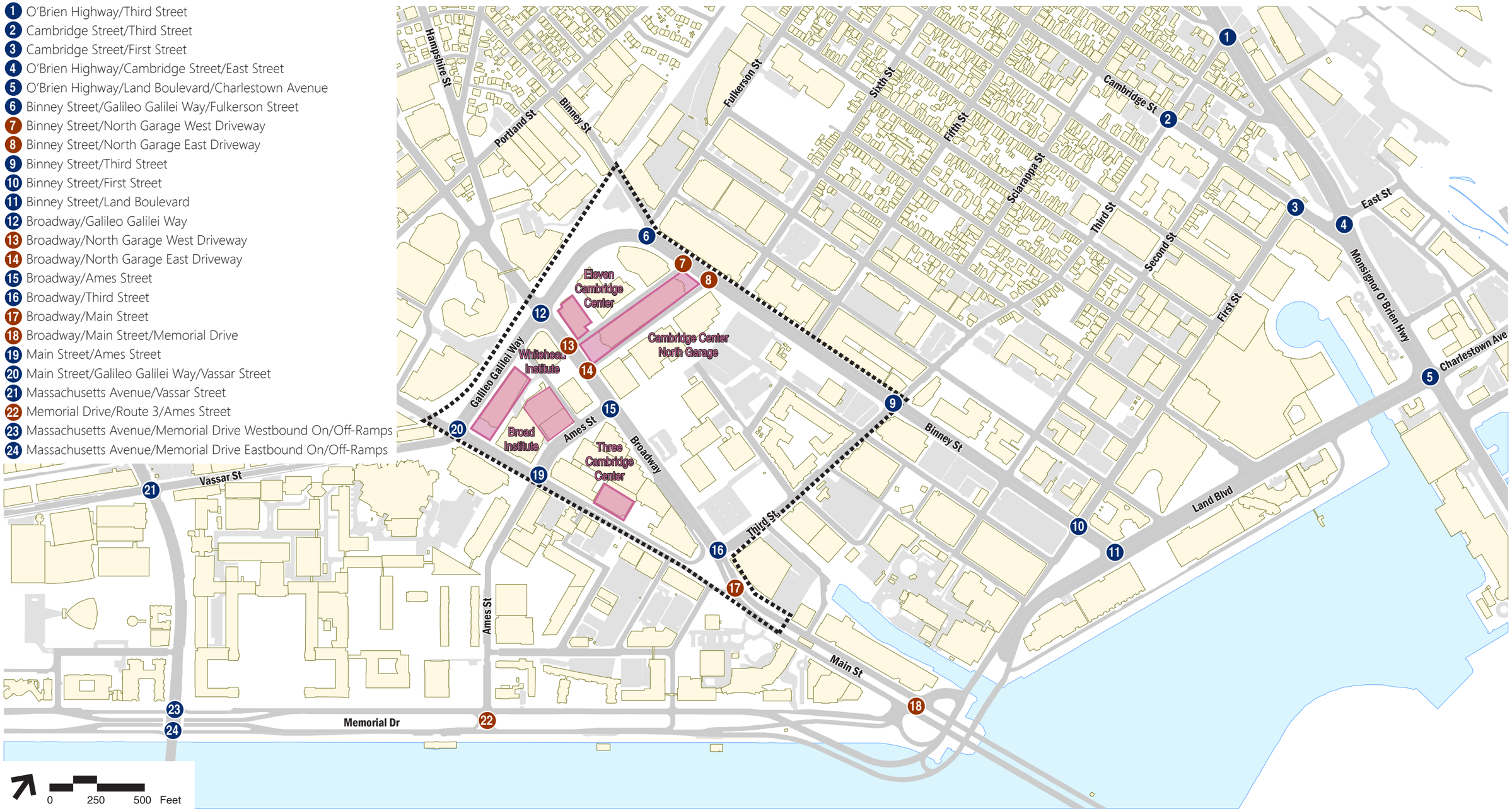
Source: FST Kendall Square Urban Renewal Area Traffic Count Program and Trip Generation Analysis

CRA

Figure 2.1
Comparison of Estimated and Observed Vehicle Trips Generated by the KSURP Area

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

1. O'Brien Highway/Third Street
2. Cambridge Street/Third Street
3. Cambridge Street/First Street
4. O'Brien Highway/Cambridge Street/East Street
5. O'Brien Highway/Land Boulevard/Charlestown Avenue
6. Binney Street/Galileo Galilei Way/Fulkerson Street
7. Binney Street/North Garage West Driveway
8. Binney Street/North Garage East Driveway
9. Binney Street/Third Street
10. Binney Street/First Street
11. Binney Street/Land Boulevard
12. Broadway/Galileo Galilei Way
13. Broadway/North Garage West Driveway
14. Broadway/North Garage East Driveway
15. Broadway/Ames Street
16. Broadway/Third Street
17. Broadway/Main Street
18. Broadway/Main Street/Memorial Drive
19. Main Street/Ames Street
20. Main Street/Galileo Galilei Way/Vassar Street
21. Massachusetts Avenue/Vassar Street
22. Memorial Drive/Route 3/Ames Street
23. Massachusetts Avenue/Memorial Drive Westbound On/Off-Ramps
24. Massachusetts Avenue/Memorial Drive Eastbound On/Off-Ramps



- KSURP Boundary
- Proposed Project Component
- (#) Signalized intersection
- (#) Unsignalized Intersection

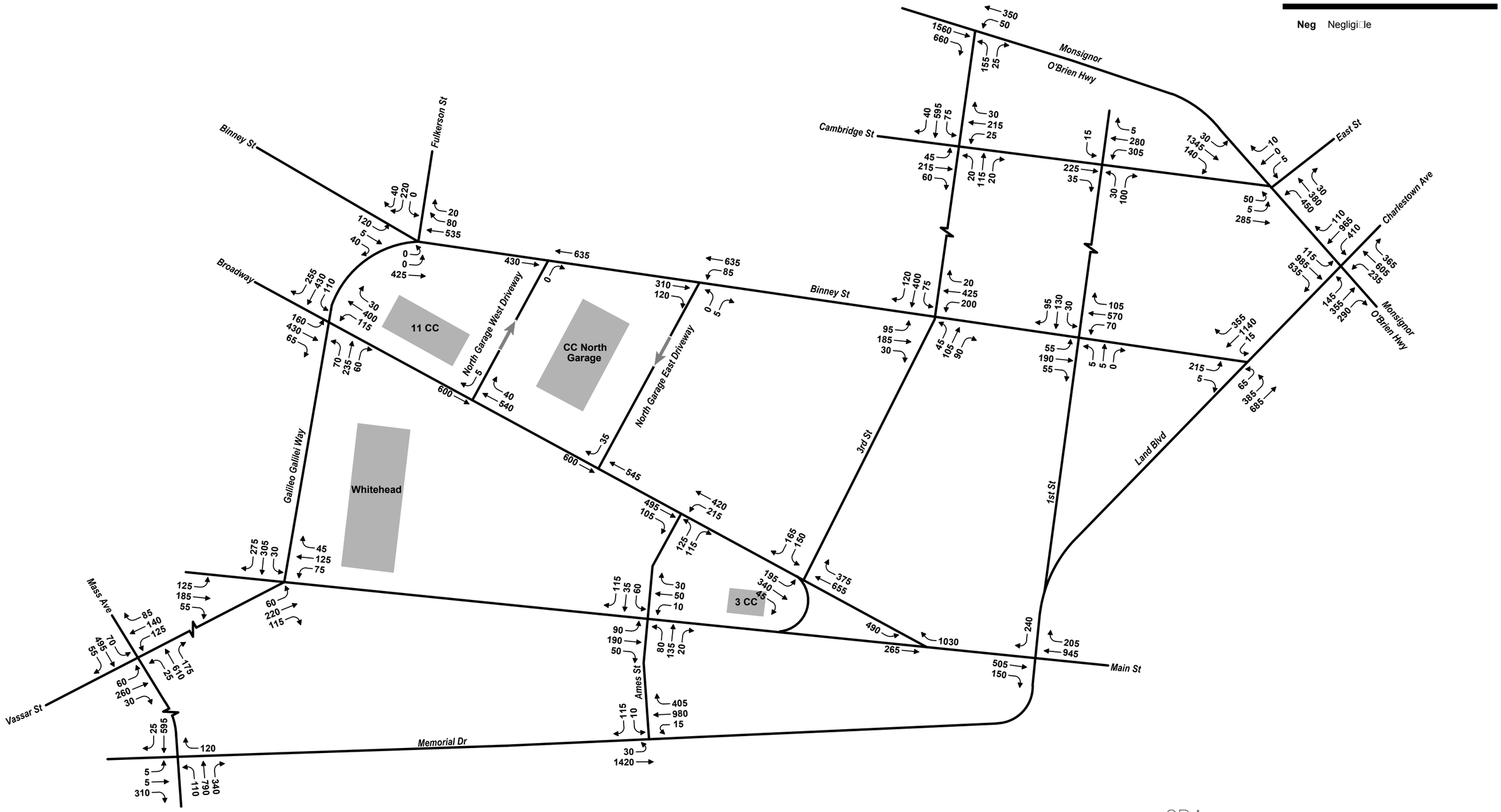
Source: City of Cambridge GIS

CRA

Figure 2.2
Study Area Intersections

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le



CRA
VHB

Figure 2.3a
2014 Existing Condition Vehicle Volumes
Morning Peak Hour (8:15 AM - 9:15 AM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le

Binney St
Fulkerson St
Broadway
Galileo Galilei Way
Mass Ave
Vassar St
Memorial Dr
Ames St
Main St
Cambridge St
Monsignor O'Brien Hwy
East St
Charlestown Ave
3rd St
1st St
Land Blvd
11 CC
CC North Garage
North Garage West Driveway
North Garage East Driveway
Whitehead
3 CC

Not to Scale

CRA
VHB

Figure 2.3b
2014 Existing Condition Vehicle Volumes
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

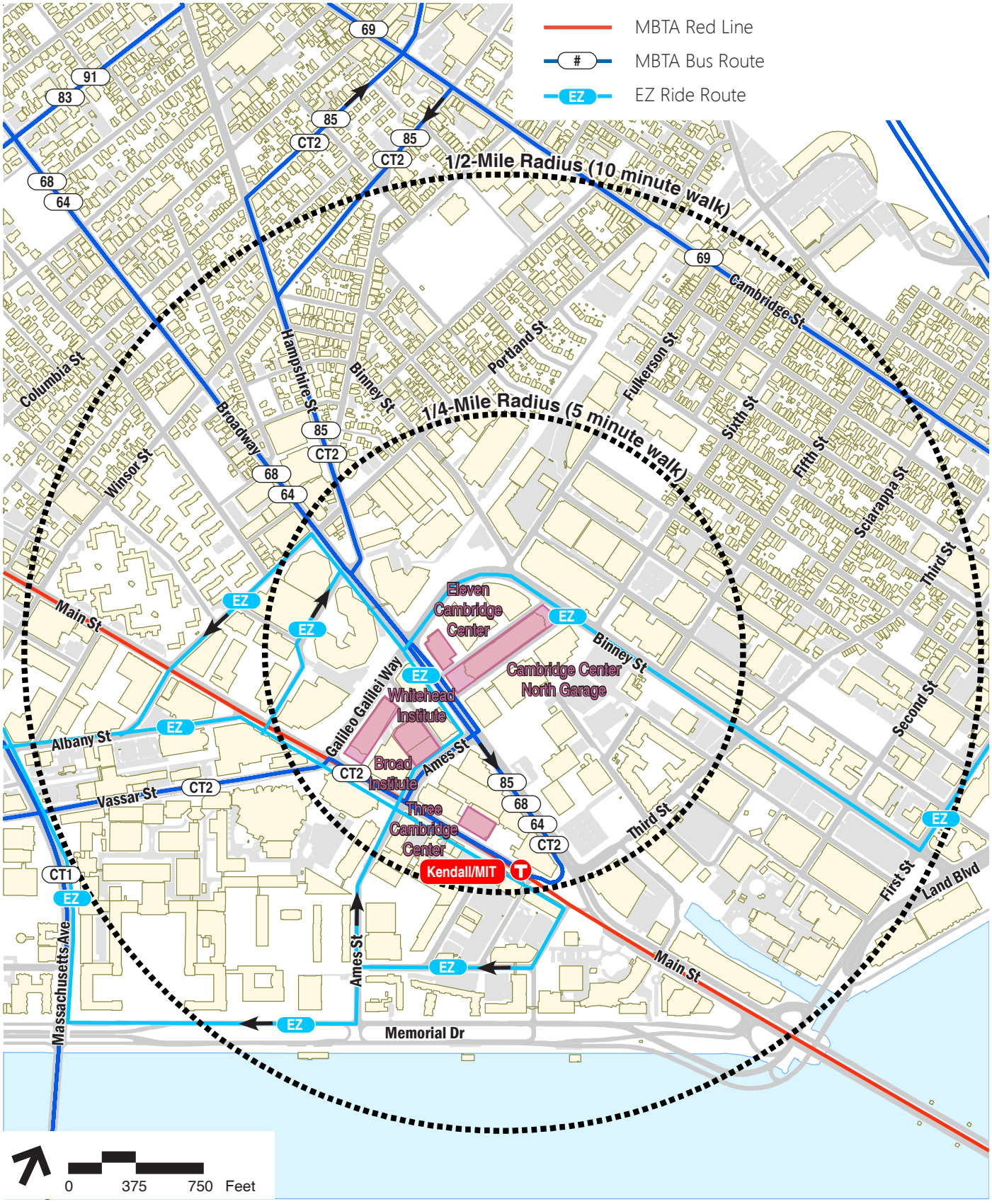


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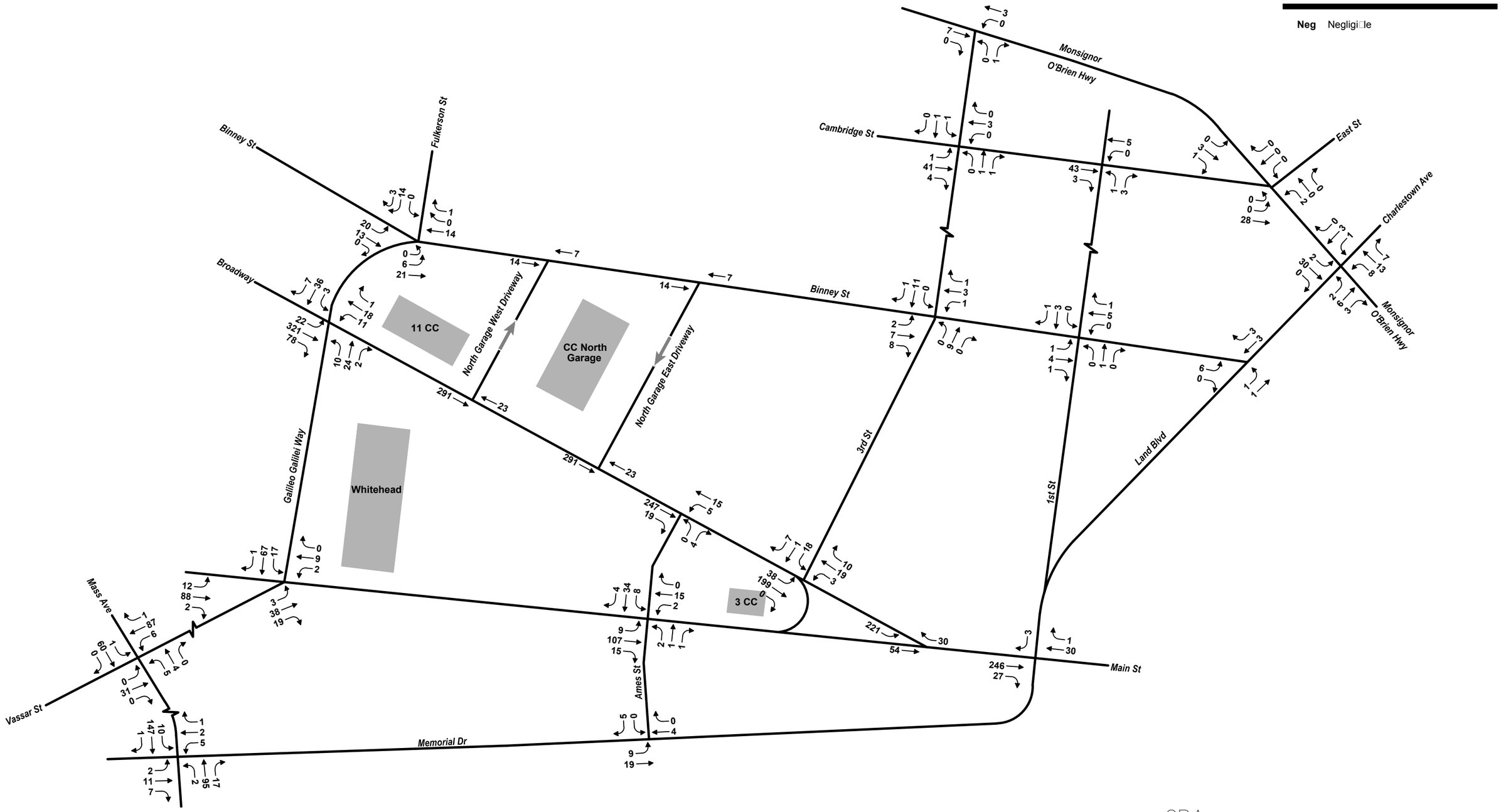
Figure 2.4
Public Transportation

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge GIS, MassGIS

Neg Negligi□le



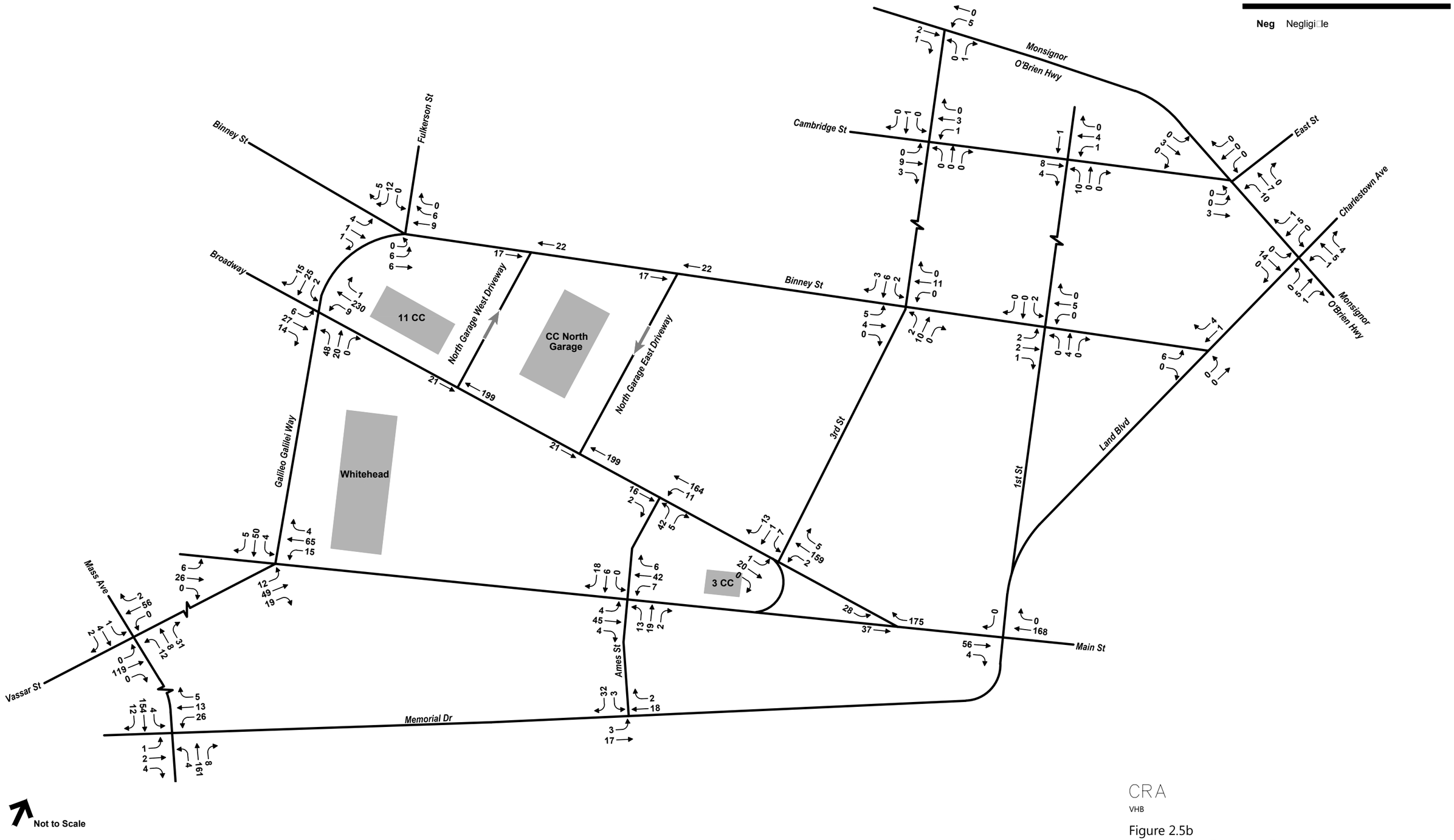
Not to Scale

CRA
VHB

Figure 2.5a
2014 Existing Condition Bicycle Volumes
Morning Peak Hour (8:15 AM - 9:15 AM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le



Not to Scale

CRA
VHB

Figure 2.5b
2014 Existing Condition Bicycle Volumes
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le

Binney St
Fulkerson St
Broadway
Galileo Galilei Way
Mass Ave
Vassar St
Memorial Dr
Cambridge St
Monsignor O'Brien Hwy
East St
Charlestown Ave
Binney St
North Garage West Driveway
North Garage East Driveway
11 CC
CC North Garage
Whitehead
3 CC
3rd St
Ames St
1st St
Land Blvd
Main St

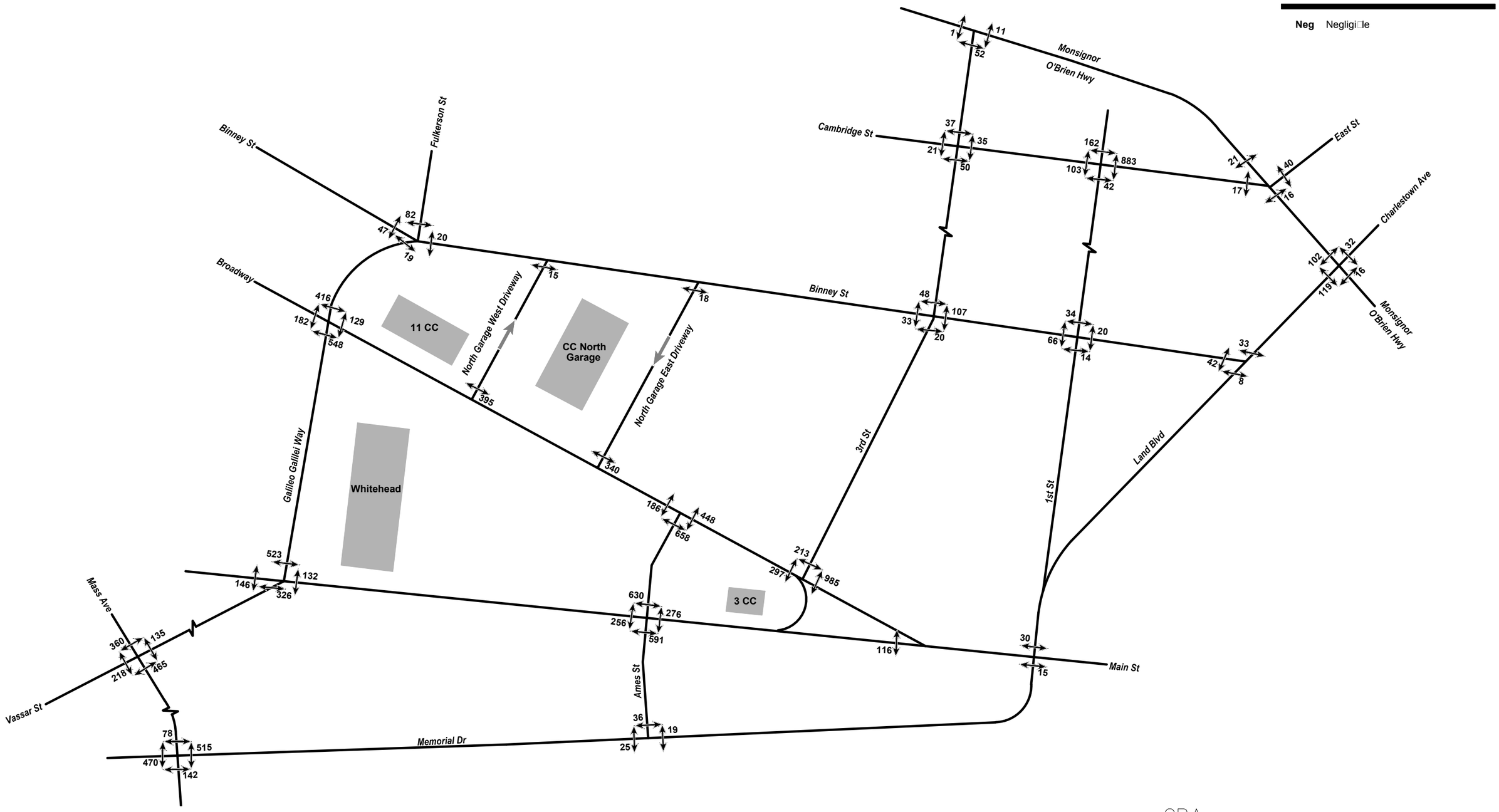
9	10	37	99	22	17	52	18	325	94	50	14	13	57	20	90	8	4	132	46	36	9	7	9
11	24	81	22	5	32	11	42	8	27	39	4	268	116	183	499	205	145	106	341	425	81	295	1088
230	50	20	440	81	59	193	609	171	128	346	218	61	170	313	21	3	5	42	200	108	35		

Not to Scale

CRA
VHB

Figure 2.6a
2014 Existing Condition Pedestrian Volumes
Morning Peak Hour (8:15 AM - 9:15 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



Not to Scale

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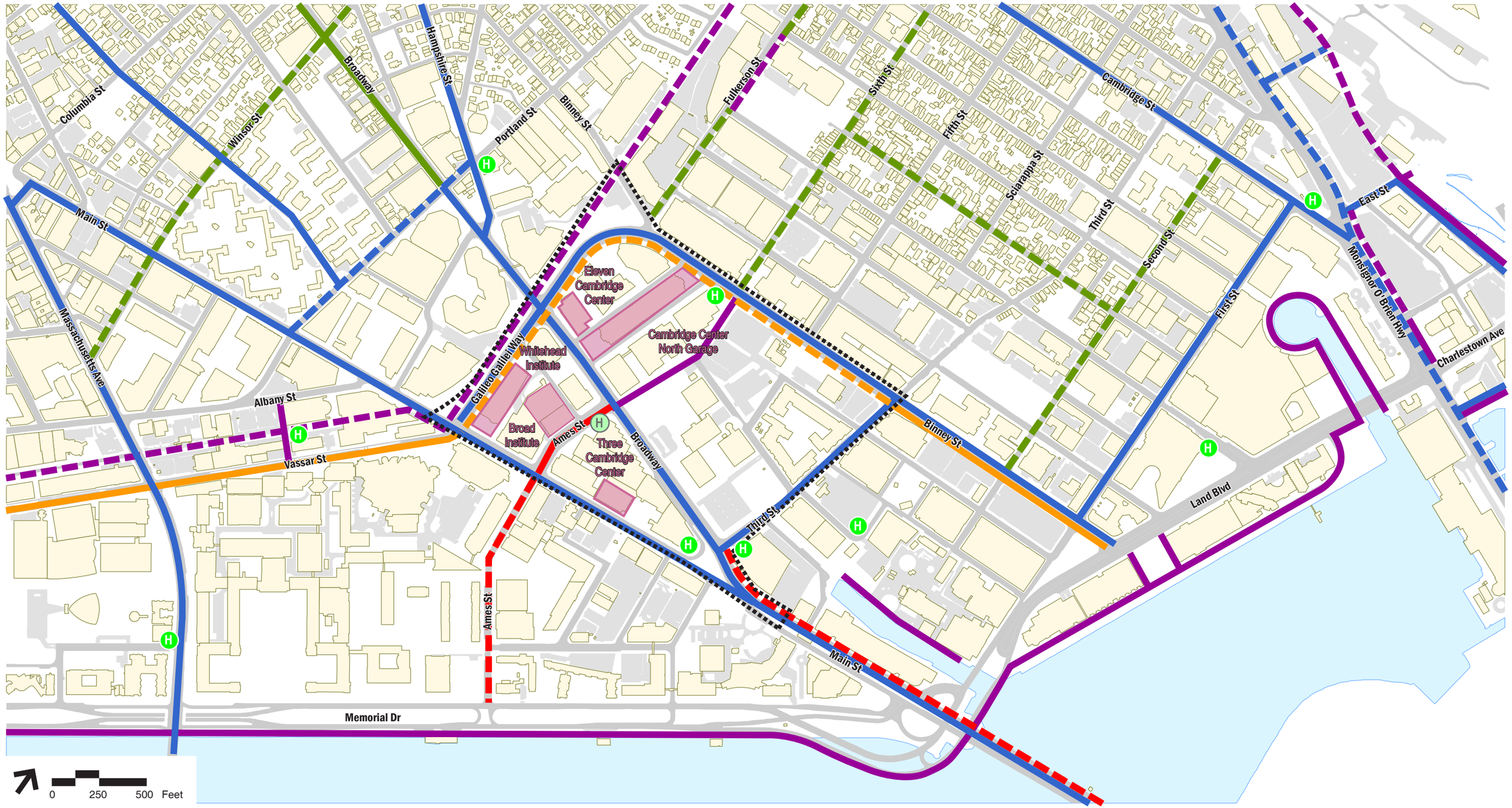
VHB

Figure 2.6b
2014 Existing Condition Pedestrian Volumes
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



KSURP Boundary

Proposed Project Component

Bike Path/Multi-Use Path

Planned Bike Path/Multi-Use Path

Bike Lane

Planned Bike Lane

Protected Bike Lane

Planned Protected Bike Lane

Cycle Track

Planned Cycle Track

Shared Lane Pavement Marking

Planned Shared Lane Pavement Marking

Hubway Station

Proposed Hubway Station

Source: City of Cambridge Bike Facilities Map

CRA

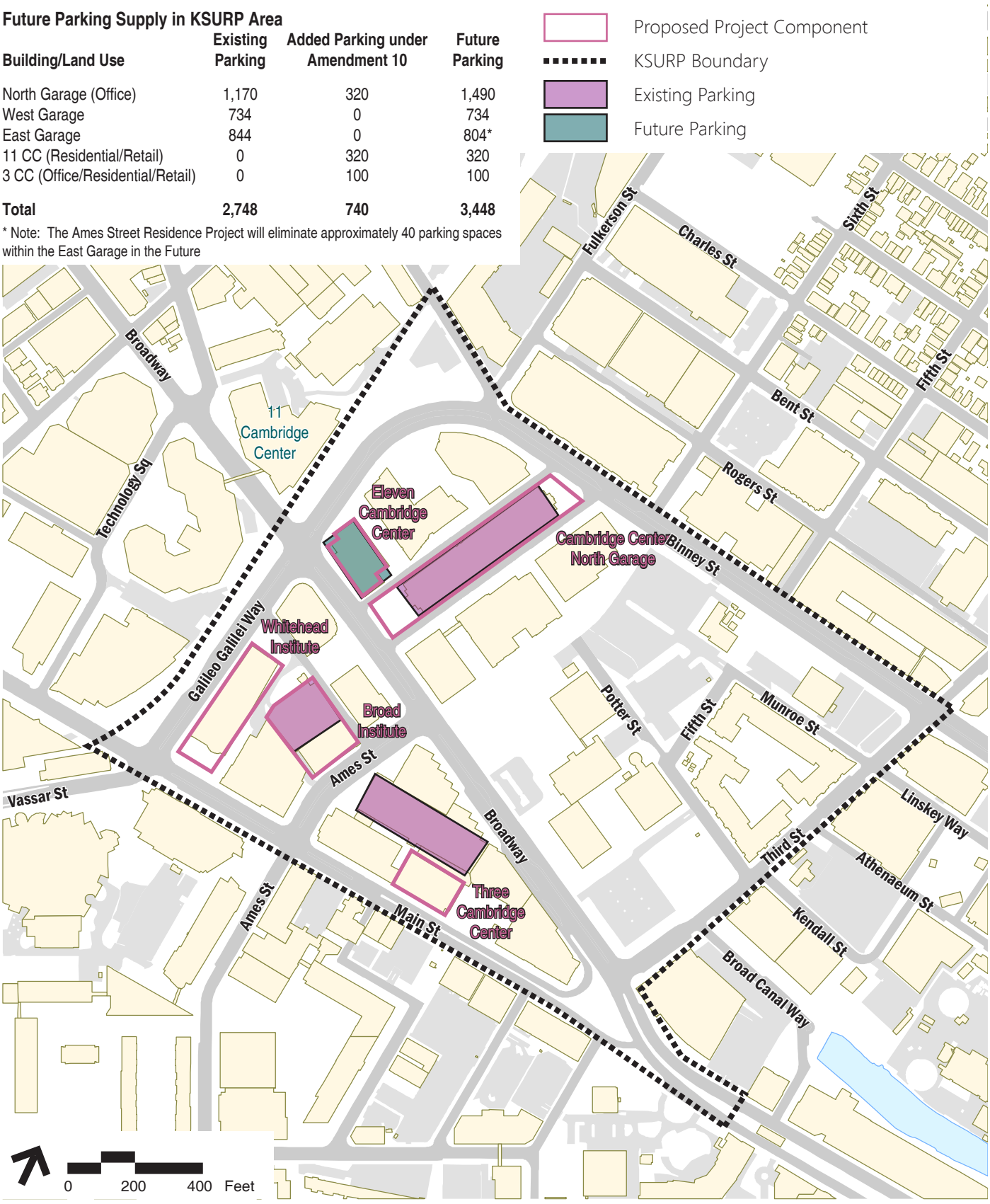
Figure 2.7
Bicycle Facilities

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Future Parking Supply in KSURP Area

Building/Land Use	Existing Parking	Added Parking under Amendment 10	Future Parking
North Garage (Office)	1,170	320	1,490
West Garage	734	0	734
East Garage	844	0	804*
11 CC (Residential/Retail)	0	320	320
3 CC (Office/Residential/Retail)	0	100	100
Total	**2,748**	**740**	**3,448**

* Note: The Ames Street Residence Project will eliminate approximately 40 parking spaces within the East Garage in the Future

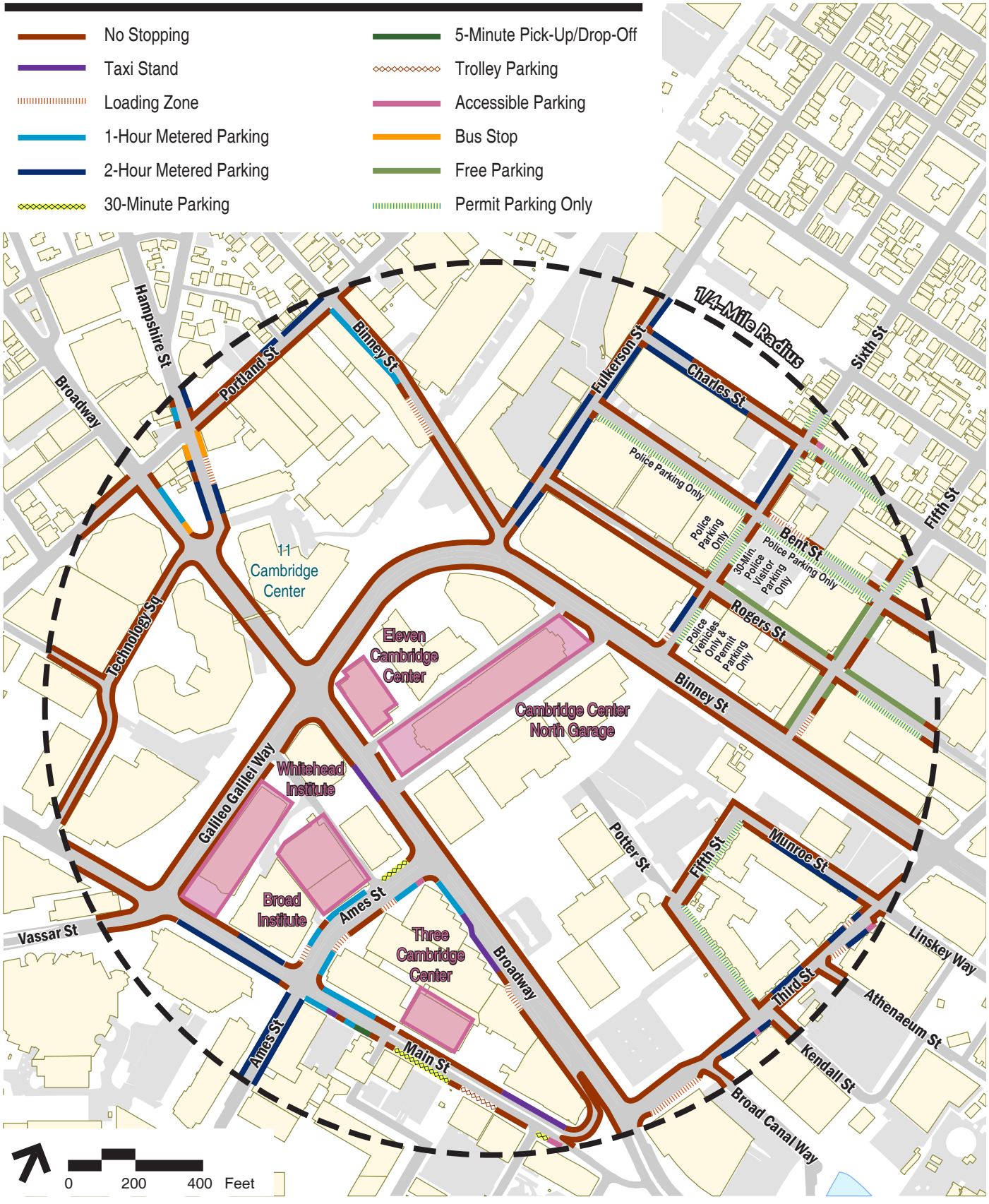


CRA

Figure 2.8
Existing and Future Off-Street Parking

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge GIS, MassGIS

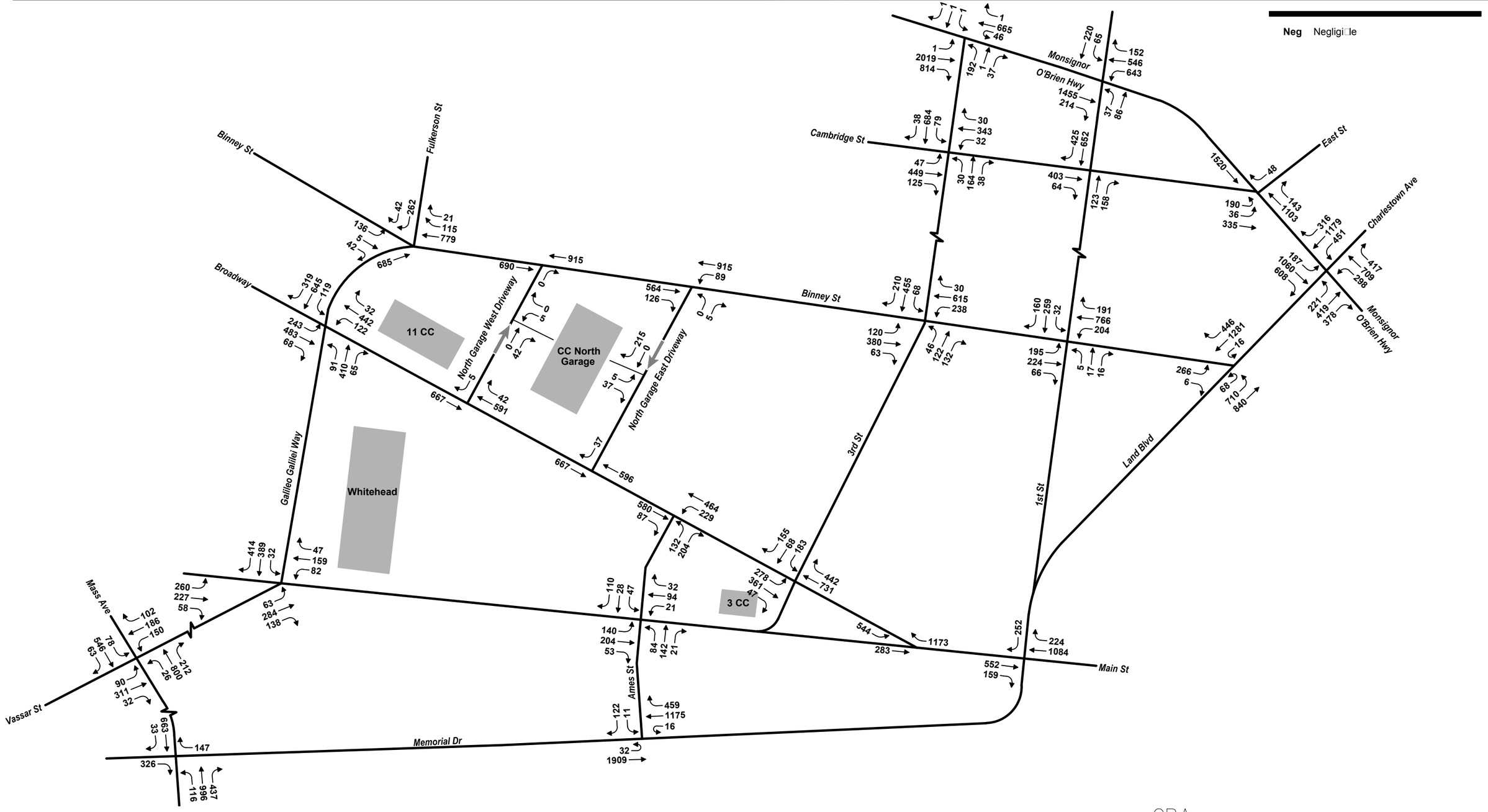


CRA

Figure 2.9
On-Street Parking

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge GIS, MassGIS

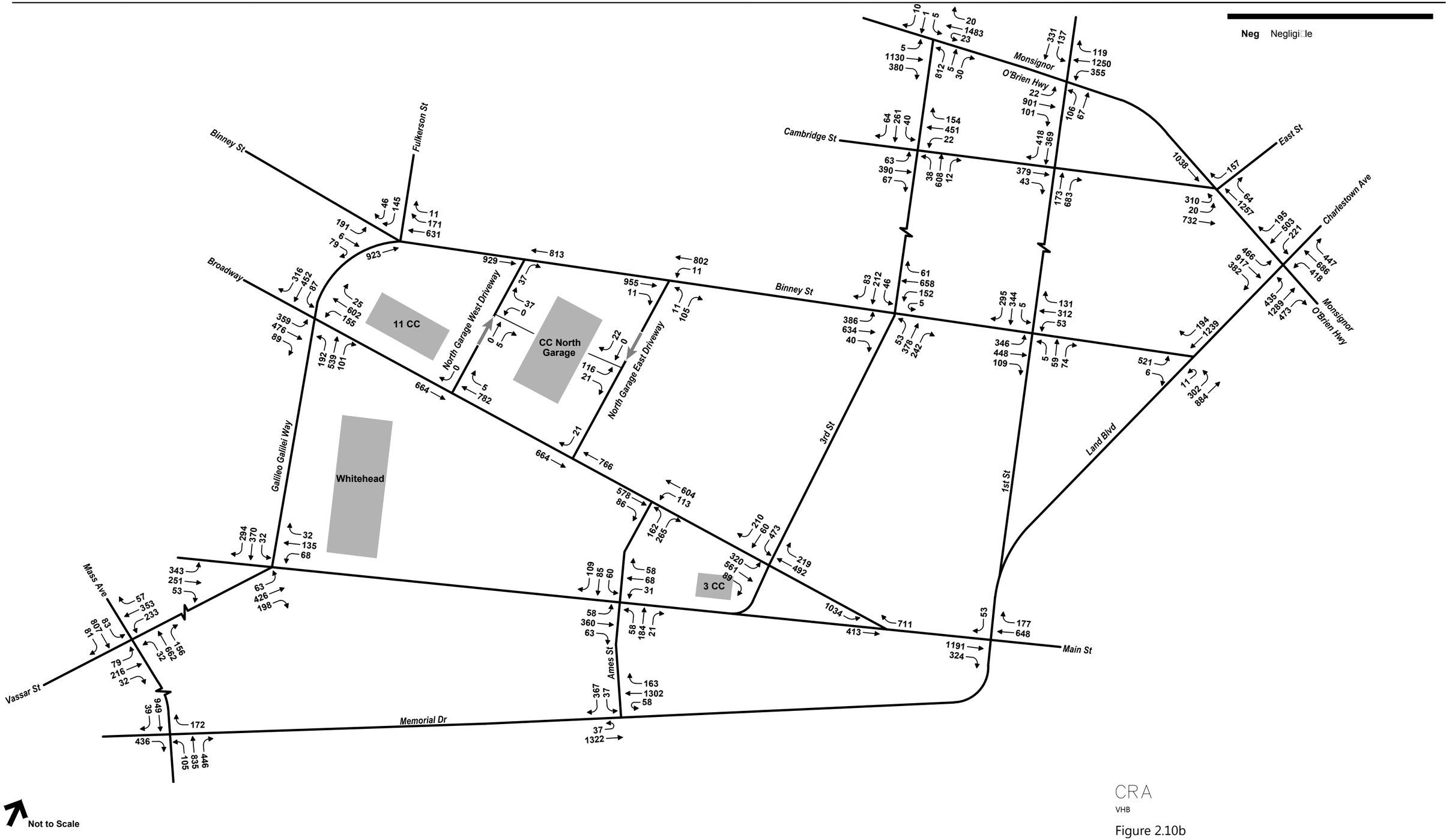


CRA
VHB

Figure 2.10a
2024 No-Build Condition Vehicle Volumes
Morning Peak Hour (8:15 AM - 9:15 AM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le

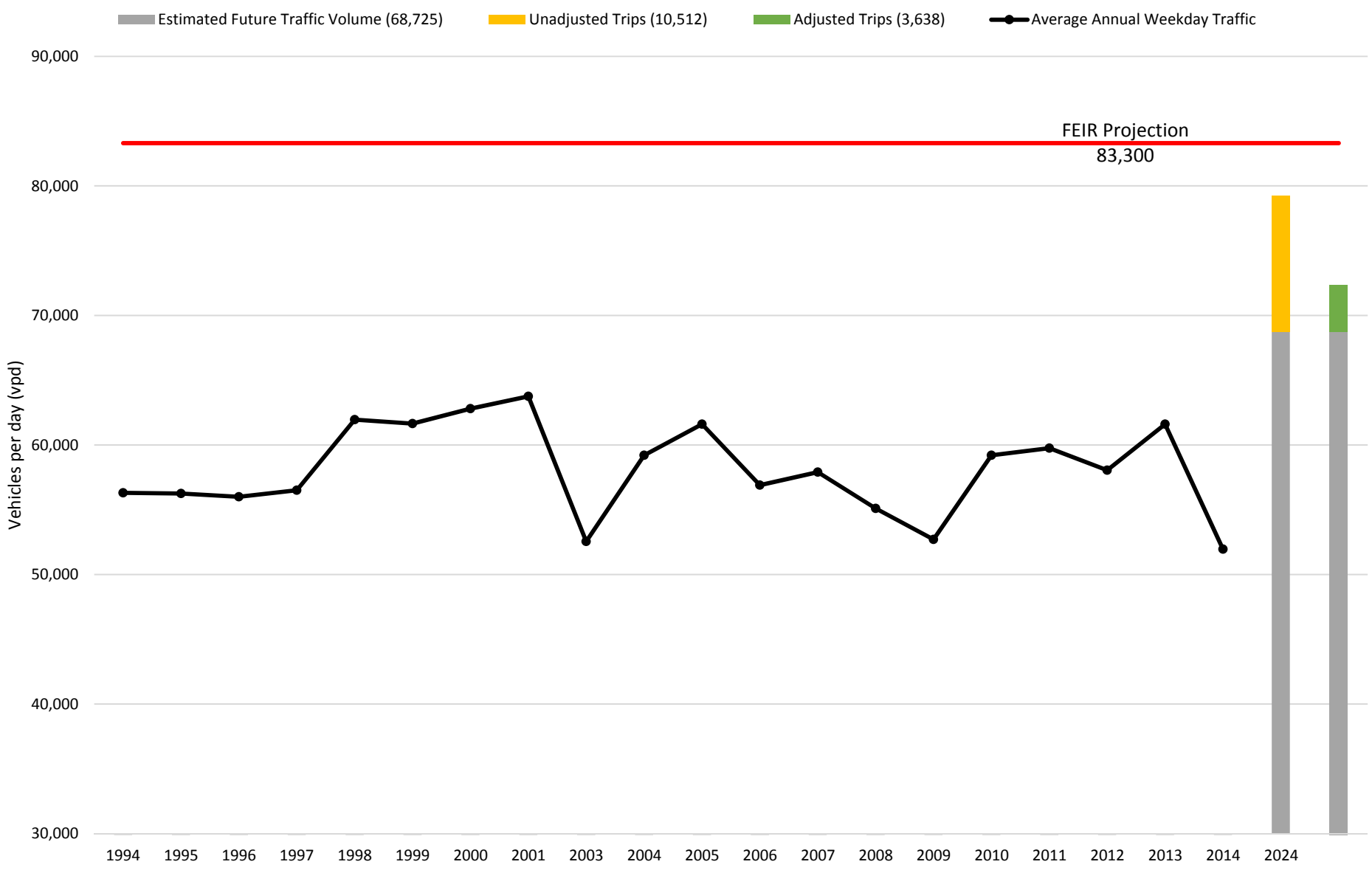


CRA

VHB

Figure 2.10b
2024 No-Build Condition Vehicle Volumes
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

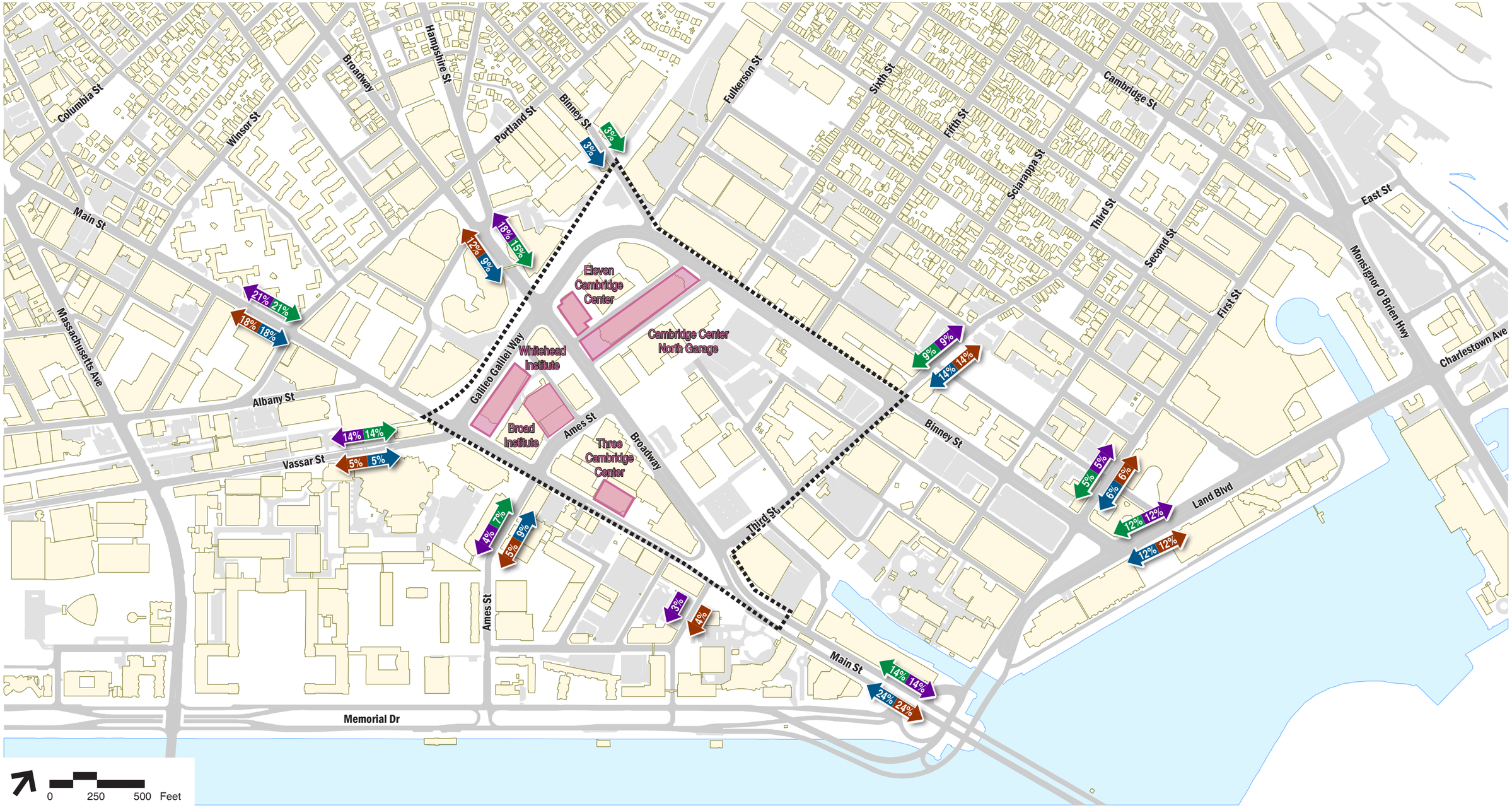


Source: FST Kendall Square Urban Renewal Area Traffic Count Program and Trip Generation Analysis

CRA

Figure 2.11
Average Annual Weekday Vehicle Traffic

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



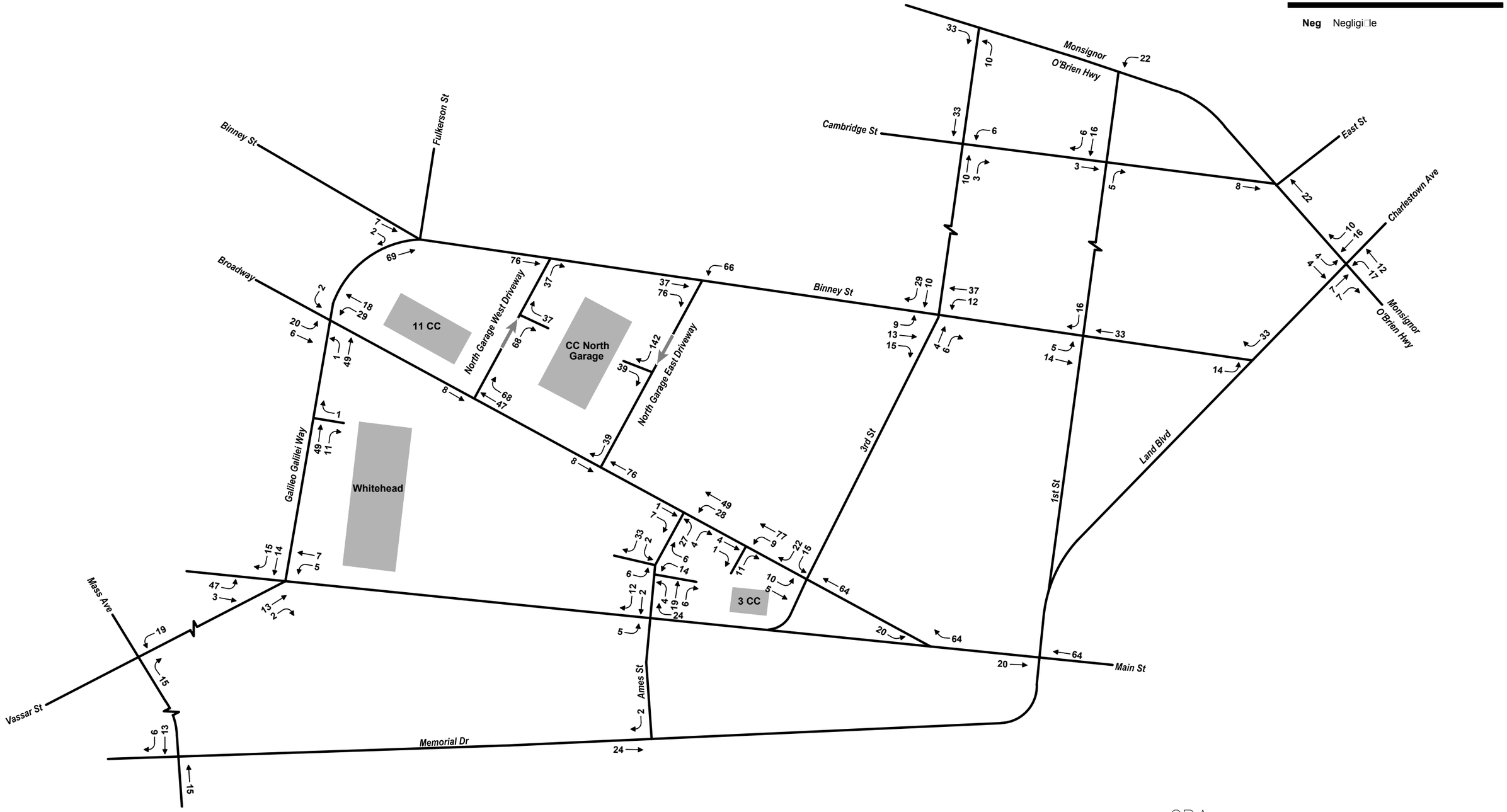
Source: City of Cambridge GIS

CRA

Figure 2.12
Trip Distribution

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le



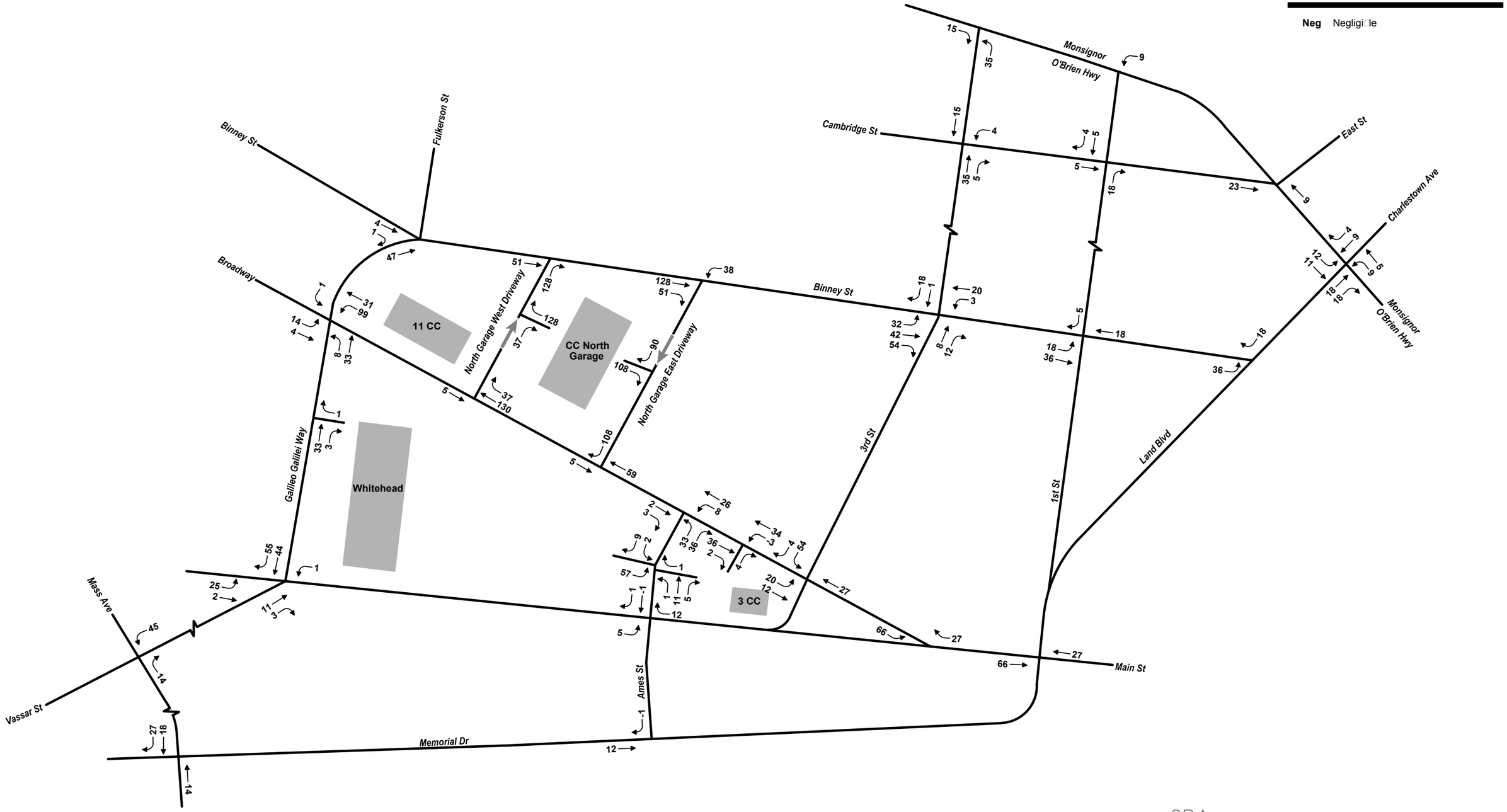
Not to Scale

CRA
VHB

Figure 2.13a
Project Generated Trips
Morning Peak Hour (8:15 AM - 9:15 AM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le

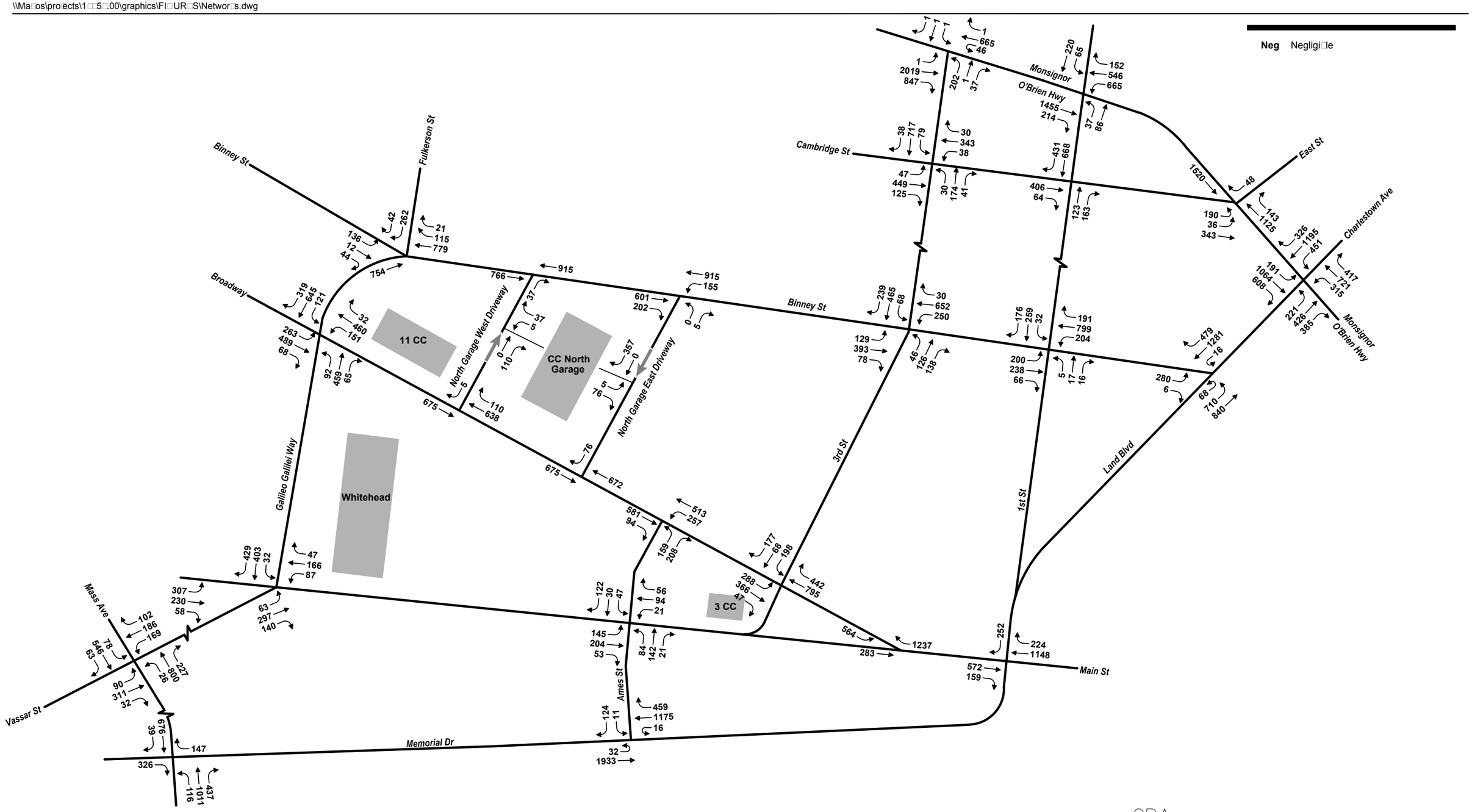


CRA

VHB

Figure 2.13b
Project Generated Trips
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



CRA

VHB

Figure 2.14a
2024 Build Condition Vehicle Volumes
Morning Peak Hour (8:15 AM - 9:15 AM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Neg Negligi□le

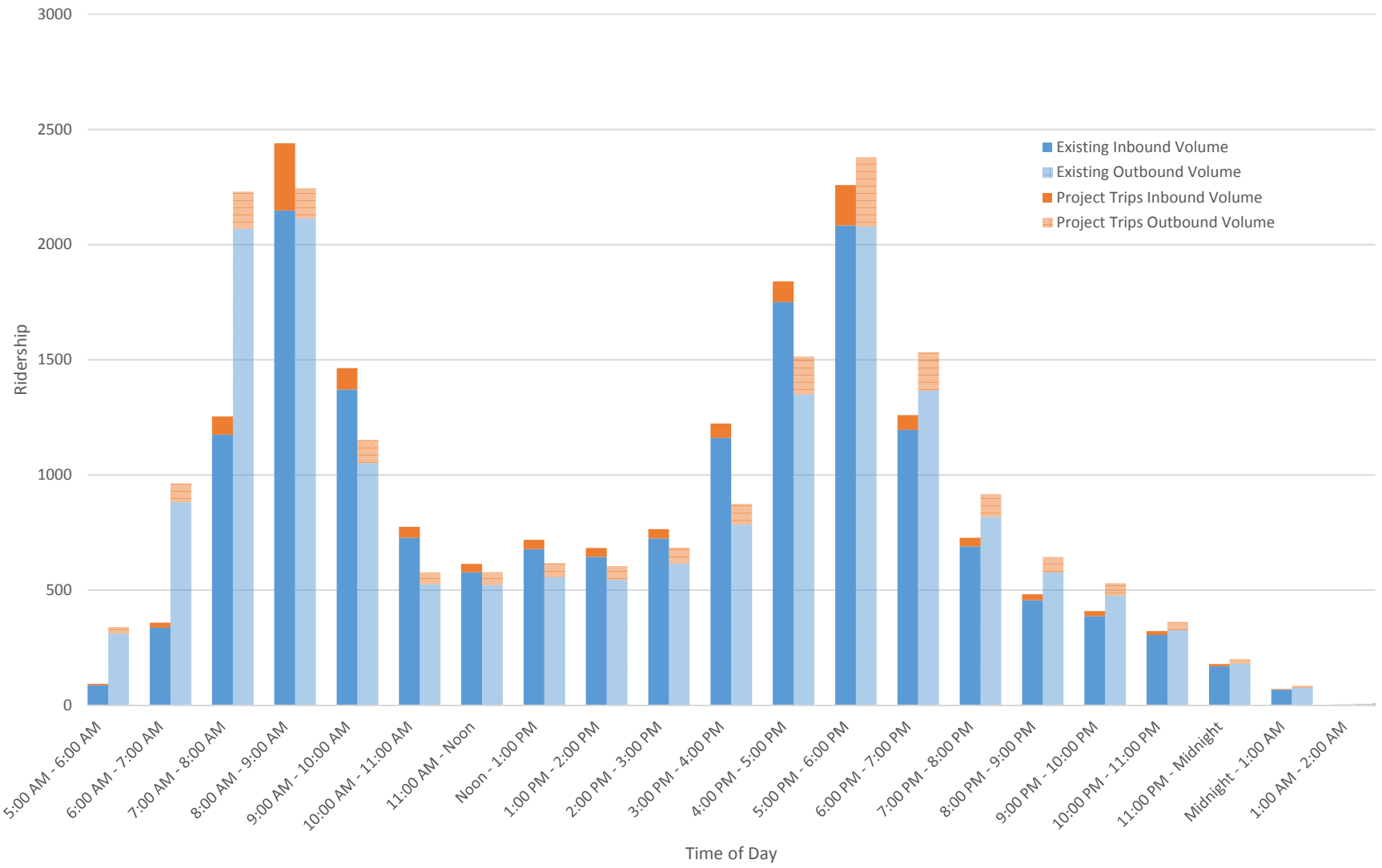
Binney St
Fulkerson St
Broadway
Galileo Galilei Way
Mass Ave
Vassar St
Memorial Dr
Ames St
Main St
Cambridge St
Monsignor O'Brien Hwy
East St
Charlestown Ave
3rd St
1st St
Land Blvd
11 CC
CC North Garage
North Garage West Driveway
North Garage East Driveway
Whitehead
3 CC

Not to Scale

CRA
VHB

Figure 2.14b
2024 Build Condition Vehicle Volumes
Evening Peak Hour (5:00 PM - 6:00 PM)

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

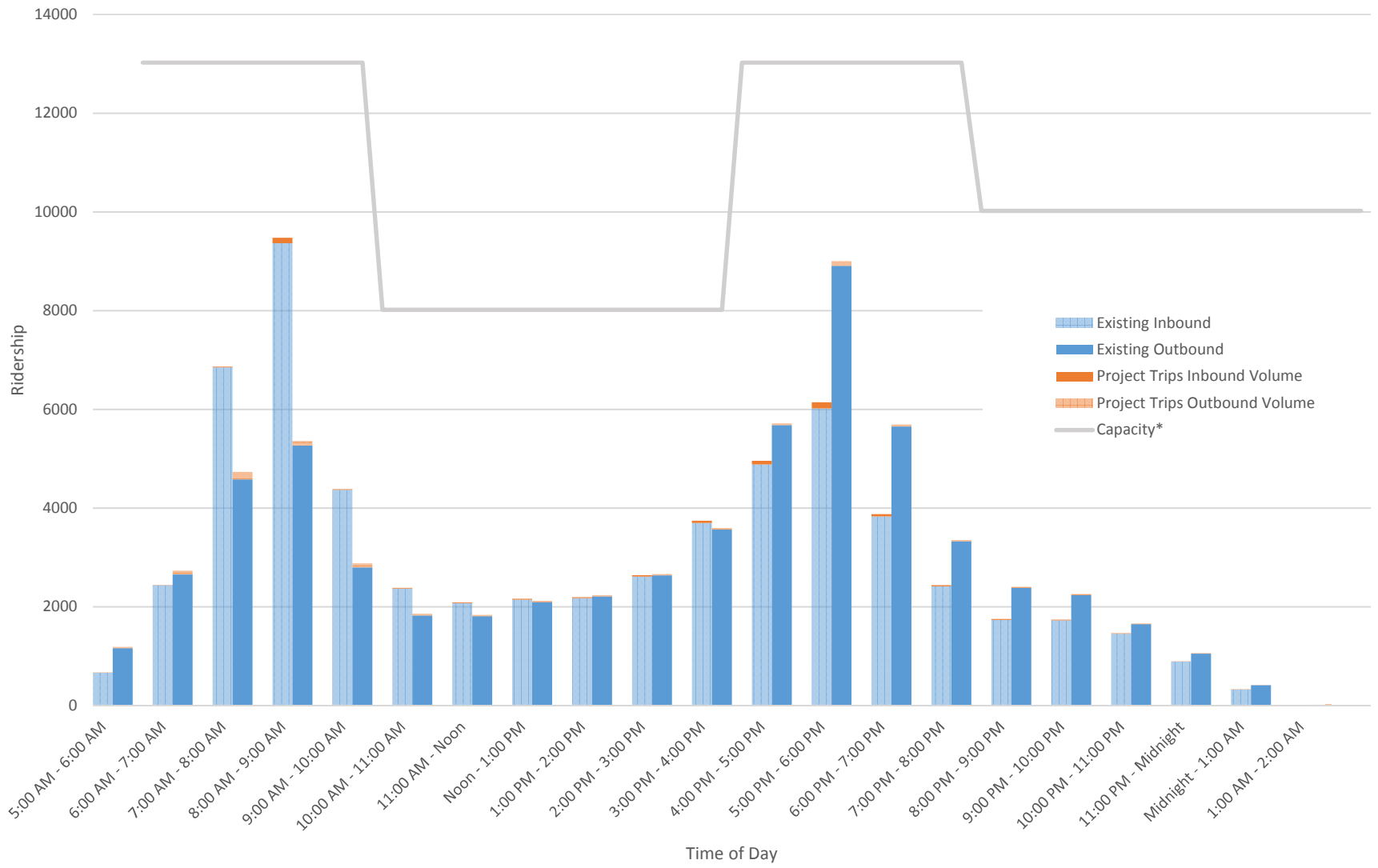


Source: MBTA Rapid Transit Schedules and Maps (Winter 2014)

CRA

Figure 2.15
Kendall/MIT Station to Future Conditions Weekday Platform Activity

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



Source: MBTA Rapid Transit Schedules and Maps (Winter 2014)

CRA

Figure 2.16
MBTA Red Line Future Conditions Weekday Ridership
Kendall/MIT Station to Charles/MGH Station

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

3

Air Quality

Introduction

This section presents an overview of the air quality assessment for the Project. The purpose of the air quality assessment is to demonstrate that the Project does not violate applicable local, state, and federal air quality standards.

The air quality assessment for this Project includes a mesoscale analysis, which evaluated the regional ozone precursor impacts of volatile organic compounds (VOC) and nitrogen oxides (NO_x). The ozone mesoscale analysis presented herein demonstrates that the Project is in compliance with the MassDEP policy on ozone emissions.

Summary of Project Change Impacts

The following changes from the Prior Project will affect the mesoscale ozone analysis:

- Since the Prior Project, standard ozone modeling and mesoscale air quality analysis methodology has changed. Recently, the U.S. Environmental Protection Agency (EPA) has adopted the Motor Vehicle Emission Simulator (MOVES) 2014 for determination of mobile source emission factors, as compared to the previously used Mobile 6.2. The EPA has concluded that MOVES provides more accurate results, which often result in smaller emissions as compared to Mobile 6.2. However, with the adoption of MOVES, mesoscale air quality analysis is now conducted on a county-wide scale. This results in much larger emissions when comparing to the local-regional scale emissions from the past mesoscale analysis approach. This often results in small proportional increases of emissions directly due to development projects when quantified on a county-wide scale, as seen in this analysis.
- The proposed new net gross square footage occupied by the Project is 1,034,600 gross square feet. Additionally, traffic in the KSURP area will increase with the Project from the Prior Project.

- Under the new project timeline, the existing conditions and build year have been pushed to 2014 and 2024, respectively. These later dates will mean that overall base mesoscale emissions will be less than those that may have been stated in previous air quality analyses as vehicle emissions decrease with time due to increasing regulations on vehicle and fuel cleanliness.

Mesoscale Analysis

Mesoscale Analysis Background

The purpose of the mesoscale analysis is to estimate the area-wide emissions of VOC, and NO_x during a typical day in the peak ozone season, consistent with the requirements of the State Implementation Plan (SIP). The mesoscale analysis evaluates the change in VOC and NO_x emissions from the average daily traffic volumes and vehicle emission rates. To demonstrate compliance with the SIP criteria, the air quality study must show the Project's change in daily (24-hour period) VOC and NO_x emissions.

MassDEP has established guidelines that define the modeling and review criteria for air quality studies prepared pursuant to review under MEPA. These guidelines require that mesoscale analyses be prepared for proposed development projects to determine the change in Project-related ozone precursor emissions. The predominant source of ozone precursor emissions anticipated from the Project is emissions from Project-related traffic. Ozone is not directly emitted by motor vehicles, but is generated when VOC and NO_x emissions from motor vehicles, stationary sources, and area sources react in the atmosphere with sunlight and heat. Project-related ozone and carbon monoxide impacts are determined by assessing the changes in VOC and NO_x emissions of motor vehicles. MassDEP criteria require that proposed development projects include all reasonable and feasible emission reduction mitigation measures if the ozone emissions from the Build Condition are greater than the No-Build Condition. Massachusetts has incorporated this criterion into the SIP.

The mesoscale analysis evaluated the change in emissions from Project-related traffic for the Existing, No-Build, and Build Conditions. The air quality analysis demonstrates that the Project will meet MassDEP air quality criteria of including all reasonable and feasible emission reduction mitigation measures. While the Build Condition VOC, and NO_x emissions are estimated to increase (0.11 kg/day for VOC and 0.62 kg/day for NO_x) as compared to the No-Build Condition, the Project will be implementing mitigation measures (including a TDM program) that will reduce VOC emissions by 0.04 kg/day and NO_x emissions by 0.08 kg/day.

Mesoscale Analysis Modeling Methodology

The mesoscale analysis evaluates the change in emissions associated with and without the Project, specifically, daily (24-hour period) VOC and NO_X emissions from the average daily traffic volumes and vehicle emission rates. MassDEP guidelines require that the air quality study utilize traffic and emissions data for existing and future (No-Build and Build) conditions. The traffic and emissions data are incorporated into the Environmental Protection Agency (EPA) and MassDEP air quality models to generate emission's estimates that demonstrate whether the Project will have air quality impacts.

The mesoscale air quality analysis utilizes developed traffic data (volumes, speeds, and roadway geometry) and emission factor data for Existing, No-Build, Build, and Build with Mitigation Conditions. The mesoscale study area includes Middlesex County, the county in which the City of Cambridge is located. Major roadways and intersections that were included in the mesoscale analysis include:

- Broadway Street
- Main Street
- Binney Street
- Memorial Drive
- 3rd Street
- 1st Street
- Galileo Galilei Way
- Land Boulevard
- Cambridge Street
- Massachusetts Avenue
- Vassar Street
- Ames Street
- Fulkerson Street
- Monsignor O'Brien Highway
- East Street
- Charleston Avenue

The mesoscale analysis calculates the changes in VOC and NO_x emissions for the existing and future conditions within the mesoscale study area. The mesoscale analysis traffic and emission factor data were developed for the four conditions mentioned above. These data were incorporated into the air quality models to evaluate the changes in VOC and NO_x emissions.

Emission Rates

EPA's Office of Transportation and Air Quality (OTAQ) has developed the MOVES[1]. MOVES2014 is EPA's latest motor vehicle emissions model for state and local agencies to estimate VOCs and NOx and other emissions' precursors from cars, trucks, buses, and motorcycles.

[1] MOVES2014 (Motor Vehicles Emission Simulator), 2014, US EPA, Office of Mobile Sources, Ann Arbor, MI.

All of the vehicle emissions used in the mesoscale analysis were obtained using EPA's MOVES2014 emissions model. MOVES2014 calculates emission factors from motor vehicles in kilograms per vehicle-mile for existing and future conditions. The emissions calculated for this air quality assessment include Tier 3 emission standards, which is an EPA program that sets new vehicle emissions standards, including lowering the sulfur content of gasoline, heavy-duty engine and vehicle greenhouse gas regulations (2014-2018), and the second phase of light-duty vehicle GHG regulations (2017-2025). It also includes Massachusetts-specific conditions, such as the state vehicle registration age distribution and the statewide Inspection and Maintenance (I/M) Program.[2]

Traffic Data

The air quality analysis utilized traffic data (volumes) developed for each analysis condition. The mesoscale analysis uses typical daily peak and off-peak traffic volumes to determine the highest daily emissions of VOC and NO_x. The vehicle miles traveled used in the air quality analysis were developed based on the traffic data analyzed for the Project (refer to Appendix C of this NPC). With the adoption of MOVES2014, the mesoscale air quality analysis is now conducted on a county-wide scale. The mesoscale study area for this Project includes the entire Middlesex County.

Existing Mesoscale Emissions

The mesoscale analysis calculated the existing VOC and NO_x emissions from the major roadways in the mesoscale study area. These emissions, estimated to be 15,246.90 kilograms per day (kg/day) of VOCs and 23,259.80 kg/day of NO_x, establish an existing baseline to which future emissions can be compared.

Future Air Quality Conditions

Future Project-related emission calculations are based upon changes in traffic and emission factor data. The traffic data include traffic volumes and vehicle miles traveled. The emission factor data included emission reduction programs and years of analysis. Under the No-Build Condition, VOC emissions were estimated to be 7,614.52 kg/day and NOx emissions were estimated to be 9,232.92 kg/day. The 2024 VOC and NO_x, emissions are lower than the 2014 emissions due to the implementation of emission control programs, such as the Federal Motor Vehicle Emission Control Program (Tier 3), the Stage II Vapor Recovery System, and the Massachusetts Vehicle Inspection and Maintenance program.

▼

[2] *The Stage II Vapor Recovery System* is the process of collecting gasoline vapors form vehicles as they are refueled. This requires the use of a special gasoline nozzle at the fuel pump.

Under the Build Condition, as presented in Table 3-1: *Mesoscale Air Quality Analysis Results*, the VOC emissions are estimated to be 7,614.63 kg/day and the NOx emissions are estimated to be 9,233.54 kg/day. The project is estimated to generate 0.11 kg of VOC and 0.62 kg of NOx per day. The results show that the Project-related mobile source emissions are projected to be minimal at a mesoscale level (Middlesex County).

Table 3-1 Mesoscale Air Quality Analysis Results (kg/day)

Pollutant	2014 Existing Conditions	2024 No-Build Conditions	2024 Build Conditions	Project-Related Emission[1]
Volatile Organic Compounds (VOCs)	15,246.90	7,614.52	7,614.63	0.11
Oxides of Nitrogen (NO_x)[1]	23,259.80	9,232.92	9,233.54	0.62

1 The future no build condition emissions are lower than the existing conditions emissions due to the implementation of state and federal emission control programs, such as the Federal Motor Vehicle Emission Control Program (Tier 3) and the Stage II Vapor Recovery System, and the Massachusetts Inspection and Maintenance program.

Proposed Air Quality Mitigation

The SIP requires that proposed projects with Build Condition VOC, and NOx emissions greater than the No-Build Condition include all reasonable and feasible emission reduction measures. As discussed in Chapter 2, *Transportation and Parking* of this NPC, the Proponent will coordinate with the City to potentially implement intersection improvements to reduce delays and queuing as well as implement TDM measures in order to reduce single-occupant vehicle trips to the KSURP area and to minimize peak-period traffic demands in the KSURP area—all of which will benefit air quality. Refer to Chapter 2, *Transportation and Parking* for a full description of the proposed transportation-related improvements.

Based on the new requirement to use MOVES2014 and the corresponding regional nature of the mesoscale analysis, emissions reduction from Project-specific traffic mitigation, such as intersection improvements and the implementation of TDM measures are minor reductions when compared to the overall county plus Project-related emissions (which are projected on a county-wide level). The implementation of the TDM plan is expected to improve air quality in the KSURP area by promoting the use of alternative forms of transportation to the use of single-occupant motor vehicles as the principal travel mode to and from the KSURP area. Previous estimates of similar TDM programs have ranged on the order of two to five percent reduction in vehicles miles traveled (VMT), which in turn will have a slight decrease in regional VOC and NOx emissions from the Build Condition.

As shown in Table 3-2, the results of the mesoscale analysis demonstrate that the roadway improvements will meet the transportation conformity criteria by reducing both VOC and NOx emissions. The mitigation measures included improved geometry and operation in the KSURP area. The mitigation measures would result in an emission reduction of 0.04 Kg/day of VOCs and 0.08 kg/day of NOx
The mitigation measures would result in an emission reduction of 0.04 Kg/day of VOCs and 0.08 kg/day of NOx.

Table 3-2 Mobile Source Emissions Mitigation Analysis Results (kg/day)

Pollutant	2024 Build Conditions	Project-Related Emissions[1]	Estimated Reductions Due to Traffic Mitigation[2]	Resulting Project-Related Emissions
Volatile Organic Compounds (VOCs)	7,614.63	0.11	0.04	0.07
Oxides of Nitrogen (NO_x)[1]	9,233.54	0.62	0.08	0.54

1 Represents the difference in VOC and NOx emissions between the 2024 No-Build and Build Conditions.
2 The traffic mitigation includes physical and operations upgrades at the intersections and does not include TDM programs which would result in minor additional emissions reductions.

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements (the proposed ETMP) designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation and associated air emissions projected to result from the Project. The ETMP will be developed in conjunction with the many stakeholders engaged in transportation planning and operations in Kendall Square, including the Kendall Square Mobility Task Force, the MBTA, and MassDOT. The ETMP would supplement the transportation mitigation measures outlined in Chapter 2.

Conclusion

The air quality assessment demonstrates that the Project complies with local, state, and federal air quality requirements. The Project is consistent with the guidelines of MassDEP because the Project will incorporate reasonable and feasible mitigation measures to reduce VOC and NO_x, emissions in the ozone mesoscale analysis. The implementation of these mitigation measures will reduce the 2024 Build VOC and NO_x emissions associated with the Project.

4

Sustainability and Greenhouse Gas Emissions Assessment

Introduction

The following chapter describes how the Project will address the local and state regulations, policies, and procedures related to sustainability, Greenhouse Gas (GHG) emissions, and climate change preparedness and resiliency. It presents the findings of the GHG emissions assessment prepared in accordance with the Executive Office of Energy and Environmental Affairs (EEA) MEPA Greenhouse Gas Policy and Protocol (the "MEPA GHG Policy").

Summary of Project Change Impacts

The Prior Project did not require a GHG assessment. Since that filing in 2008, the MEPA GHG Policy became effective for any project requiring an Environmental Impact Report (EIR) or at the discretion of the Secretary of EEA. Given the proposed approximately 1,034,000 million square feet (net new) associated with Project Change, a full assessment of stationary and mobile source GHG emissions was required. Additionally, since the Prior Project, the City has adopted the Stretch Energy Code, which includes more stringent energy efficiency requirements than the state's base energy code.

Also since the Prior Project, the MEPA Office developed a draft policy the would require projects to consider and assess the risk and vulnerabilities of a project or action in the context of climate change as part of the MEPA review process.

Key findings and benefits related to sustainability, GHG emissions and climate change preparedness/resiliency include:

- Through the implementation of a comprehensive design strategy, including responsive mitigated design and operational commitments, the Project is

expected to result reductions in GHG emissions consistent with the MEPA GHG Policy.

- The Project consists of urban infill with dense, high-efficient buildings, a building reuse component (the North Garage Office Buildings) and reduced single-occupancy vehicle trips through alternative modes of transportation—all of which result in significantly less GHG emissions compared to a suburban "greenfield" development.
- All Project Components will meet the current Stretch Energy Code requirements, where applicable (i.e., achieve at least a 20 percent overall reduction in annual energy use compared to a baseline using requirements of ASHRAE 90.1-2007).
- The Proponent has considered additional energy efficiencies that may be required to meet the future potential Stretch Energy Code (i.e., approximately 15 percent more efficient than the IECC2012 and ASHRAE standard 90.1-2010—the new/updated state-wide Base Energy Code).
- As demonstrated by the stationary source GHG assessment, overall the Project will achieve an estimated 17.2 percent reduction in stationary source CO_2 emissions by reducing overall energy consumption by approximately 25.1 percent through the implementation of energy optimizing building design and systems. (Note, the percentages of energy use are different than emission reductions due to emissions conversion factors.)
- A reduction of 105 tons per year in mobile source GHG emissions by implementing the traffic mitigation measures.
- During the early stages of project planning and design, the Proponent has begun to evaluate potential climate change impacts and plan for resilience.

Regulatory Context

The following sections provides an overview of the state and local regulatory context related to energy efficiency and GHG emissions.

Commonwealth of Massachusetts

MEPA Greenhouse Gas Policy and Protocol

The Executive Office of Energy and Environmental Affairs (EEA) has developed the MEPA Greenhouse Gas Emissions Policy and Protocol (the "MEPA GHG Policy") – an initiative under the MEPA review process that requires project proponents to identify and describe the feasible measures to minimize both mobile and stationary source GHG emissions generated by their proposed project(s). Mobile sources consider vehicles traveling to and from a project. Stationary sources consider on-site

boilers, heaters, and/or internal combustion engines (direct sources) as well as from the consumption of energy in the form of fossil fuels (indirect sources). Greenhouse gases include several air pollutants, such as carbon dioxide (CO_2), methane, hydrofluorocarbons, and perfluorocarbons. The MEPA GHG Policy calls for the evaluation of CO_2 emissions for a land development project because CO_2 is the predominant man made contributor to global warming. This evaluation makes use of the terms CO_2 and GHG interchangeably.

The MEPA GHG Policy states that all projects undergoing MEPA review requiring the submission of an Environmental Impact Report (EIR) must quantify the project's GHG emissions and identify measures to avoid, minimize, or mitigate such emissions. In addition to quantifying project-related GHG emissions, the MEPA GHG Policy requires proponents to quantify the effectiveness of proposed improvements in terms of energy savings, and therefore, potential emissions reductions. The goal of the MEPA GHG Policy is to identify and implement measures to minimize or reduce the total GHG emissions anticipated to be generated by that respective project.

Massachusetts Stretch Energy Code

As part of the Green Communities Act of 2008, Massachusetts developed an optional building code that gives cities and towns the ability to choose stronger energy performance in buildings than the state building code (the "Stretch Energy Code"). Codified by the Board of Building Regulations and Standards as 780 CMR Appendix 115.AA of the 8th edition Massachusetts Building Code, the Stretch Energy Code is an appendix to the Massachusetts building code, based on further amendments to the International Energy Conservation Code (IECC). The Stretch Energy Code increases the energy efficiency code requirements for new construction (both residential and commercial) and for major residential renovations or additions in municipalities that adopt it.

The City was designated a Green Community under the Green Communities Designation and Grant Program, an initiative of the Department of Energy Resources (DOER). The goal of the grant program is for the municipality to use this grant money to help residents, businesses, and the municipality departments/facilities reduce energy use or install renewable energy systems. In order to be designated a Green Community and, therefore, eligible for grant money available annually, the community is required to find ways to minimize life-cycle costs, such as adopting and implementing the Stretch Energy Code, which the City did in July 2010.

The current Stretch Energy Code requires the Project to achieve at least a 20 percent overall reduction in annual energy use compared to a baseline using requirements of ASHRAE 90.1-2007. For projects of this size and type, the Stretch Energy Code requires modeling of base and proposed cases based on the methodology as is defined in ASHRAE 90.1- Appendix G. On July 1, 2014, the IECC2009 and ASHRAE 90.1-2007 ceased to be a code option for non-stretch Code communities, and the IECC2012 and

ASHRAE standard 90.1-2010 became the new/updated state-wide Base Energy Code. It is expected that an updated Stretch Energy Code, when enacted, will require additional energy reductions beyond these standards and that Green Communities, such as Cambridge will automatically adopt any updates to the Stretch Energy Code (unless they vote to change their bylaw to no longer be a stretch code community). At the time of this NPC filing, the updated Stretch Energy Code requirements remain unknown, however, the MEPA Office and DOER suggest new large projects target approximately 15 percent energy savings beyond the Base Energy Code requirements based on IECC2012 and ASHRAE 90.1-2010.[1]

Based on the history of the Project and through discussions with MEPA, a Base Energy Code using ASHRAE 90.1-2007 has been assumed. However, the ASHRAE 90.1-2010 building improvement requirements are also presented to demonstrate how the Project would meet the future potential Stretch Energy Code. Because the Project is in early stages of design, the assumptions on certain Project elements, such as interior fit-out and specific HVAC equipment efficiency ratings have been made to calculate the estimated GHG emissions reduction associated with the Project.

MEPA *DRAFT* Climate Change Adaptation and Resiliency Policy

In September 2014, the MEPA Office issued for public comment a draft policy for addressing potential impacts associated with climate change as part of the MEPA review process. The policy is proposed in order to fulfill MEPA's statutory obligations under the Global Warming Solutions Act of 2008. The policy's intent is to facilitate the consideration and assessment of risk and vulnerabilities of a project or action under foreseeable scenarios or conditions associated with climate change in order to identify potential mitigation measures. Public comments on the draft policy were received until February 23, 2015.

City of Cambridge Initiatives

The City has already committed to a range of initiatives to support and encourage sustainable lifestyles and move the community toward greater resilience to climate change:

- In December 2013, the City created the "Getting to Net Zero Task Force" charged with advancing the goal of putting Cambridge on the trajectory towards becoming a "net zero community", with focus on GHG emissions from building operations. This includes reducing energy use of buildings and taking advantage of opportunities to harvest energy from renewable sources.

[1] MA Commercial Building Energy Code Status for Projects Subject to the MEPA GHG emissions Policy and Protocol, with Building Related Stationary Sources, MA DOER, August 1, 2013.

- The Climate Protection Action Committee (CPAC) proposed new greenhouse gas emission reduction goals to the City Manager in spring 2014. These involve both community and municipal government actions toward greater sustainability.
- Early 2015, the City began to turn the information gathered through the Climate Change Vulnerability Assessment into a Climate Change Preparedness & Resilience Plan, relying heavily on community input to design an actionable plan.
- The City secured major grant funding to support the development of a Kendall Square EcoDistrict and initiate a study of district energy opportunities. The CRA and most major landowners and property managers in the KSURP are deeply involved in the formation of the EcoDistrict and related study of district energy.
- In 2013, the City signed the Compact for a Sustainable Future, in partnership with Harvard University, MIT and key business stakeholders. This Compact, which has since expanded to include the CRA and Boston Properties as signatories, creates a framework for collaboration on climate change mitigation and resiliency planning.
- Through the CitySmart and Cambridge Energy Alliance programs, Cambridge is engaging closely with residents and businesses to educate and push for action through behavior change towards sustainable modes of transportation, residential and business energy efficiency measures, and use of renewable energy in local buildings.
- The City passed a Building Energy Use Disclosure Ordinance in 2014, and is considered a key step in efforts to reduce GHG emissions city-wide. Efforts to improve the energy performance of our building stock is hampered by the invisible nature of energy use. The ordinance is intended to address this problem by requiring owners of larger buildings to track and report annual energy use to the City and publicly disclose the data. Disclosure places the information in the marketplace, where various users such as potential property buyers, tenants, realtors, energy service providers, and others can use the data and to help create value for higher energy performing properties. The data will also aid the City and others in planning for higher energy performance in our building stock. The ordinance is a foundational strategy for various community sustainability initiatives including the Community Compact for a Sustainable Future, Kendall Square EcoDistrict, and efforts to move the community toward net zero emissions. Municipal buildings reported energy use for calendar year 2013, some non-municipal buildings will need to begin reporting energy use for the 2014 calendar year by May of 2015, with the remainder one year later.
- The City is one of 50 communities competing over the next two years in the Georgetown University Energy Prize, a national competition that is challenging communities across the U.S. to rethink their energy use. To compete for the $5 million prize, local governments, residents, utilities, and others will need to work together to demonstrate success in sustainably reducing energy consumption over a two-year period. The energy competition will heighten the City's drive to unite

the entire community to embrace energy efficiency on a large scale, and result in further positive outcomes for GHG emissions.

- The Cambridge Bicycle Network Plan identifies streets and paths which provide direct connectivity between neighborhoods and key destinations within the City and adjacent jurisdictions. It will prioritize the funding, redesign, reconstruction, and maintenance of projects to promote the completion of a connected low-stress network that provides a bicycling option for people of all ages and abilities throughout the City. It is envisioned that over time all streets within the City will ultimately be designed to facilitate comfortable, low- stress bicycling, thereby influencing mode shift to bicycling and walking and resulting in further positive outcomes for GHG emissions.
- A Cambridge Transit Strategic Plan is currently in development through the combined efforts of an Interdepartmental Staff Working Group that includes the CRA, as well as the Cambridge Transit Advisory Committee. In January 2013, the City launched a 2- year public transit strategic planning process. The purpose was to develop an action plan for how Cambridge will take a stronger leadership role to improve quality and expand capacity of our transit system. The City issued a Transit Strategic Plan Update Report in January 2014, and is currently integrating prioritized objectives into the FY16 budget processes which is underway. This plan is intended to influence mode shift to transit and result in further positive outcomes for GHG emissions.
- The City has established an Eastern Cambridge/Kendall Square Open Space Study and design competition to explore ways to provide a network of well connected, managed and programmed new and existing parks and open spaces that serve a variety of users, and provide a range of experiences and environments. The implementation and long-term outcomes of this effort are expected to further solidify the internal walkability and livability of the district as well as address the impact of the urban heat island effect, thereby resulting in further positive outcomes for GHG emissions.

K2 Plan

As described previously in Chapter 1, *Project Change Description,* the K2 Plan was published in December 2013 as the result of an extensive community-based planning and design process. The K2 Plan contains a specifically actionable set of four goals and several recommendations within each goal. Goal #4 is simply "Promote Environmental Sustainability." Recommendations outlined below from Goal #4, while the K2 Plan itself contains detailed actionable implementation strategies for each recommendation.

Goal #4: Promote Environmental Sustainability

A. Incorporate significant sustainability elements through land use planning approach.
B. Continue to require green design for buildings and site design.

a. Improve building energy performance.
b. Prevent urban heat gain.
c. Reduce reliance on automobiles.
d. Reduce stormwater runoff.

C. Go beyond existing approaches to more sustainable design.
a. Minimize waste generation.
b. Increase use of renewable energy and/or district energy.

D. Create K2 EcoDistrict through public-private partnership.

The implementation strategies found in Goal #4 are seen as critical actions to further improve the City's already notable position as a model for smart growth, active healthy communities through design and reduced per-capita GHG emissions.

Getting to Net Zero Energy Task Force

The Getting to Net Zero Task Force committee, comprised of residents, community advocates, business and property owners, and representatives of local universities, is working with City staff and a team of technical consultants to examine strategies and develop recommendations. The Task Force is charged with advancing the goal of putting Cambridge on the trajectory towards becoming a "net zero community", with focus on carbon emissions from building operations. This includes reducing energy use intensity of buildings and taking advantage of opportunities to harvest energy from renewable resources. The Task Force is tasked with addressing the following topics:

- Reduce GHG emissions from buildings;
- Improve energy efficiency and conservation in existing and new buildings;
- Support renewable energy generation both on- and off-site; and
- Best practices to engage and educate building users and influence occupant behavior.

The Task Force is assigned to study the technical aspects of GHG emissions from buildings and develop comprehensive, actionable, long and short term recommendations, which may include changes to City ordinances, zoning policies, and other directives. A draft Net Zero Report released in March 2015 included recommendations and a short and long term action plan. The following key elements, or actions, have been identified in order to move closer to a net zero community:

- Highly energy efficient new and existing buildings;
- The use of onsite renewables;
- The use of offsite renewables; and
- The use of offsets and RECs (as a temporary measure).

Cambridge Climate Change Planning

In December 2002, the City Council adopted the Cambridge Climate Protection Plan. Both the state and the City have adopted a goal of 80 percent reductions in greenhouse gas emissions by 2050. The City is completing a new plan with interim measures aimed at 2020.

The City's planning around climate change focuses on reducing greenhouse gas emissions. When Cambridge began to draft its initial Climate Protection Plan, staff evaluated the relative sizes of the various sources of emissions. The City already had extensive transportation and recycling programs that worked to reduce the community's generation of greenhouse gases. However, Cambridge found that most emissions are related to buildings. The Climate Protection Plan, therefore, focuses largely on actions around building-related energy. The Cambridge Energy Alliance was one important initiative. Other building energy initiatives target both existing buildings—much of the City's building stock is relatively old and inefficient—and new construction, with more stringent energy efficiency requirements.

As the effect of existing human-derived greenhouse gases already present in the atmosphere has made climate disruption inevitable, Cambridge has concluded that the City should begin to prepare now for the effects of climate change. With that goal in mind, the City will be releasing a Climate Change Vulnerability Assessment in first quarter 2015 and moving directly into the creation of a Climate Change & Resilience Plan. It is anticipated that future action will involve both mitigation and adaptation to climate change.

Climate Change Vulnerability Assessment and Preparedness & Resiliency Plan

The City is undertaking a climate change vulnerability assessment, which will run until early 2015 and serve as the foundation for a Climate Change Preparedness and Resilience Plan. This effort is being 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. A Technical Advisory Committee (TAC) composed of community stakeholders is helping guide the assessment and providing critical information. An Expert Advisory Panel (EAP) is providing feedback on the assessment's technical approach and assumptions. Public workshops and community presentations are engaging residents, businesses, and organizations

The assessment includes modeling of coastal storm surges to understand the potential for surges to bypass dams; modeling of inland storms to assess the capacity of the stormwater system to cope with intense rainfall; and mapping of heat vulnerability. Information on vulnerable populations, buildings, and infrastructure is being

collected to create a baseline for analysis. With this information, the City will rate the sensitivity of critical assets and populations as well as their capacity to adapt and recover from impacts. This will help to establish priorities for Cambridge's climate change preparedness plan.

The flood modeling includes:

- Using the City's storm water system model to understand the impact of changes in precipitation and the implications for drainage system backups and riverine flooding.
- Working with the Massachusetts Department of Transportation on modeling coastal storm surges associated with sea level rise in Boston Harbor with the Advanced Circulation (ADCIRC) model to assess whether the storm surges could overwhelm the Charles River Dam and the Amelia Earhart Dam in 2030 or 2070.
- Looking at the flooding that might result from the combined effect of sea level rise, coastal storm surges, and greater precipitation.

Other technical analyses that are being performed include:

- Mapping and projecting surface and air temperatures to understand heat vulnerability;
- Assessing the vulnerability of our urban forest to flooding and increased temperatures;
- Mapping of demographic factors, infrastructure, and community assets and;
- Modeling economic impacts from flooding and business disruption.

In December 2014, a public meeting was held to discuss the climate change vulnerability assessment project approach and preliminary findings. Preliminary findings indicated that heat island effect may need to be the top focus of the City's Preparedness and Resilience Plan. A second meeting will be held in the first quarter of 2015 to present and discuss the interim results of the Vulnerability Assessment. Then the City intends to begin the Climate Change Preparedness and Resilience Plan during the first part of 2015.

Approach to Sustainability

Sustainability is integrated in to the Project concept and design. A sustainable approach to a project can include repurposing previously developed land rather than building on untouched land, as well as locating new development within high density areas and areas with highly accessible public transportation access. By constructing new commercial and residential spaces on previously developed sites a portion of which will be constructed above a reused portion of an existing building, the Project is

designed to achieve energy savings associated with construction and associated GHG emissions.

As a Transit Oriented Development (TOD), the Project will utilize the existing public transportation and mode share infrastructure to further reduce traffic and indirect air emissions, including mobile source GHG emissions. TOD is environmentally, economically, and socially sustainable; it promotes greater mobility, walking and biking, healthy lifestyles; value for property owners, businesses, local governments, transit authorities and residents. A recent study by the Center for Transit-Oriented Development shows that TOD produces approximately 43 percent less emissions than conventional suburban development.

The project design will prioritize sustainability as a core strategic imperative and will implement state-of-the-art high performance green building technologies, construction, and operating procedures. Sustainability planning with an integrated design team during conceptual design will establish a pathway to Gold-level certification under the Core & Shell Leadership in Energy and Environmental Design (LEED®) Green Building Rating System and superior energy use intensity performance, consistent with the K2 Plan. The project design team will use iterative energy modeling and life cycle analysis that considers the long-term value of sustainable property investment decisions. The following is a summary of key sustainable design goals for the Project:

- Stretch Code Compliance and associated Energy Savings and stationary source GHG reductions
- Energy Conservation Measures to be considered/evaluated as design progresses, including:
  - Building Orientation and Window Locations shall be suited for improved energy efficiency
  - Cogeneration
  - Solar Photovoltaic System
- Decreased Energy Use Intensity (EUI)
- Construction and Demolition Waste Diversion (to aim for a goal of 95%)
- Low VOC finishes, paints, adhesives, and sealants
- LED Common Area Lighting
- Reduced Irrigation and Potable Water Use through rainwater harvesting

Sustainable Site Features

The Project is inherently sustainable because it is within a dense urban area with access to public transit. As shown previously in Figure 2.3, the MBTA Red Line

directly serves the KSURP area via Kendall Square/MIT subway station as well as four bus routes. This station is within a 5-minute walk from the Project Components (a 1-minute walk from Three Cambridge Center). The Project is a model for transit-oriented development (TOD) since it reduces the need for single-occupancy vehicle use by proposing density in an area accessible by pedestrians and supported by an extensive public transit network. In compliance with the City's bike parking requirements, the Project will provide approximately 800 long-term bicycle spaces and 142 short-term bicycle spaces for the Project. Additionally, the Proponent will develop a robust program of TDM measures to reduce automobile trips generated by the Project.

The Proponent is planning to implement sustainable site features for the Project to mirror the sustainability strategies of the City, which will also serve to make the Project more resilient to climate change. These features are discussed further in the Climate Change Adaptation section. The Project will be required to implement Low Impact Development (LID) technologies to aid in the stormwater mitigation required by the City. These technologies are discussed in later sections, but include the implementation of subsurface infiltration, landscaped bioretention areas, nutrient reduction technologies, green roofs, efficient irrigation systems and rainwater harvesting. As the individual developments progress, sustainable site features will be researched and implemented to the greatest extent practicable given the high urban density of the Project as a whole.

Sustainable Building Features

Green building strategies are integral to the project design. The Project will strive for the greatest achievable and economically viable design and construction. For the commercial components, the facilities will be energy efficient with a long term focus on maintenance to minimize long term impacts on the environment. The facilities will include a number of sustainable strategies including, green roofs to mitigate the heat island effect, storm water detention, reduced water usage and solar photovoltaic (PV) panels.

Resource Efficiency

The current Stretch Energy Code requires that the Project show at least 20 percent overall reduction in energy used as compared to the IECC2009/ASHRAE 90.1-2007 code compliant baseline model. Since the IECC 2012 and ASHRAE 90.1-2010 is more stringent than the current Code, the proposed HVAC and Lighting systems and the Energy Conservation Measures (ECMs) were selected so that the overall energy savings fall within 25 and 30 percent better than 90.1-2007 and, therefore, also meet the potential future Stretch Energy Code requirements.

The Project was split into four stages and the proposed ECMs and systems were categorized under four key components for building energy model purposes: (i) commercial office; (ii) residential; (iii) laboratory; and (iv) retail. The proposed ground floor retail uses are small and insignificant when compared to the other key spaces so they were not modeled separately.

For the commercial office components, a Dedicated OA system was proposed to provide fresh air to the office and amenity spaces, heating and cooling systems depending on the geometry of the building and energy efficiency factors were proposed to be a floor-by-floor water-cooled, DX system or a zone-by-zone Fan Coil Unit system. In the residential components, units will be naturally ventilated, and heating and cooling will be provided through high-efficiency Water Source Heat Pump system. A high-efficiency Energy Recovery Unit provides fresh air to the corridors while it recovers heat from the toilet exhaust. Finally, the laboratory space (60 percent lab and 40 percent office was assumed for the Whitehead Office Addition) will be ventilated, heated and cooled via a VAV 100 percent outside air (OA) Air Handling Unit equipped with energy recovery, using chilled water and hot water to condition to supply air.

The proposed light fixtures will incorporate LED and CFL technology wherever possible, which will help in reducing the interior lighting power density in all spaces by at least 10 percent as compared to the Base Energy Code.

The following is a summary of the proposed ECMs:

- Improved Glazing Properties
- Improved Roof Insulation
- Improved Exterior Wall Insulation
- Improved Interior Lighting Power Density
- Low-flow Water Fixtures and High-efficiency Domestic Water Heater
- Variable Volume Condensing and Chilled, and Hot Water Pumping
- High-Efficiency Centrifugal Chillers
- VFD on Cooling Tower Fans and Higher CW Delta T
- High-Efficiency Condensing Gas-fired Hot Water Boilers
- High-Efficiency Water Source Heat Pumps
- High-Efficiency Energy Recovery Ventilator
- Differential CO2 Based Demand Control Ventilation for Offices
- CO Control and VFD for Underground Garage Fans

- Solar photovoltaics will be investigated further as the design progresses.[2]

Greenhouse Gas Emissions Assessment

In addition to quantifying project-related GHG emissions, the MEPA GHG Policy also requires proponents to quantify the impact of proposed GHG reduction measures in terms of emissions and energy savings. The goal of the MEPA GHG Policy is to identify measures to reduce or minimize GHG emissions. While GHG emissions include several gases, Carbon Dioxide (CO_2) was selected for evaluation because it is the most significant component of project-related GHG emissions. EPA has not set NAAQS for GHGs; however, they do encourage strategies to reduce emissions and save fuel.

This following provides an overview of the local and state regulatory context related to sustainable design and presents the results of the GHG emissions assessment, in accordance with the MEPA GHG Policy. The Proponent is committed to incorporate many key aspects of sustainability and high performance building design as well as addressing climate change impacts and planning for resilience, where applicable and feasible, as it is their intent to lease and operate the buildings in a sustainable manner.

Effective July 2010, the City adopted the Stretch Energy Code. The Project has been designed to meet the requirements of the current Stretch Energy Code requirements for GHG emissions. At the request of MEPA, the ASHRAE 90.1-2010 building improvement requirements are also presented to demonstrate how the Project would meet the future potential Stretch Energy Code. The Project will be evaluated with and incorporate sustainable design, including energy conservation measures throughout the design process in order to meet future requirements.

Stationary Source Assessment Methodology

To provide for energy efficiency and reduced stationary source GHG emissions, the Proponent has evaluated the following key planning and design criteria:

1. Methods to reduce overall energy demand through appropriate design and sizing of systems; and
2. Methods to incorporate cost-effective energy-optimizing systems.

The Project was modeled with the proposed building geometry, HVAC system type, occupancy schedule, and ventilation rates as the baseline buildings.

[2] At this early stage it is difficult to predict how much roof area will be available to support PV. The GHG assessment includes preliminary order-of-magnitude calculations in order to demonstrate the possible PV capacity for the Project. This evaluation will continue to evolve through the design process.

Direct stationary source CO_2 emissions include those emissions from the facility itself, such as boilers, heaters, and internal combustion engines. Indirect stationary source CO_2 emissions are derived from the consumption of electricity, heat, or cooling from off-site sources, such as electrical utility or district heating and cooling systems. The direct and indirect stationary source CO_2 emissions from the proposed building sources are calculated using the computer-based eQUEST model[3] based on assumptions for the Project's building elements, such as (but not limited to) the specific type of use(s) and users of the buildings, building configuration and architecture type, building envelope (walls/windows), interior fit-out (where known), and HVAC system and equipment efficiency ratings.

The GHG mitigation measures can be divided into the buildings' construction materials, architecture, and the heating and cooling processes. The following presents the specific proposed building improvements (and their correlating eQUEST modeling parameters for reference, where applicable) that are assumed to be included as part of the Project for the purpose of this analysis. The specific proposed improvements may be subject to design modifications as necessary to achieve the GHG emissions reduction based on the final building program and design.

eQUEST Model and Analysis Conditions

The eQUEST model is used to estimate the amount of annual energy consumption by simulating a year of building operations based on typical yearly weather and user inputs. The model estimates the buildings' electricity and gas usage based on building design and system assumptions following the energy modeling protocol outlined in Appendix G of ASHRAE 90.1-2007.[4] The amount of consumed energy is then converted into the amount of CO_2 emitted using the standardized conversion factor.[5] The stationary source assessment calculated CO_2 emissions for the following build conditions:

- **Build Condition with MA Building Code (the "Base Case"):** The Project assuming typical construction materials and building equipment/systems that meet the minimum requirements of the MA Building Code (8th Edition), or the base code. This baseline is established by the energy code as being defined by ASHRAE 90.1 – 2007.
- **Build Condition with Stretch Energy Code (the "Design Case"):** The Project assumes building design and system improvements in order to meet the current Stretch Energy Code (i.e., 20 percent over ASHRAE 90.1-2007).

▼

[3] eQUEST (the Quick Energy Simulation Tool), version 3.64 release from James J. Hirsch, DBA James J. Hirsch & Associates, Camarillo, CA.

[4] American National Standards Institute/American Society of Heating, Refrigerating and Air-Conditioning Engineers, Inc., ASHRAE 90.1-2007-Energy Standard for Buildings Except Low-Rise Residential Buildings, Appendix G, 2007.

[5] 730 lb CO2/MWh was used to convert electricity consumption into the amount of CO2 emissions (2013 ISO-New England Marginal Emissions Report). 117.08 lb CO2/Mbtu was used to convert gas consumption into the amount of CO2 emissions (The Energy Information Administration Documentation for Emissions for GHG).

Stationary Source Emissions Assessment

Future Stationary Source CO_2 Emissions

The Project includes the construction of multiple buildings with various uses, including commercial office, innovation space, laboratory space, residential, retail and parking. The approach to and results of the building energy model for each Project Component is presented below. The noteworthy improvements for each of Project Components are also presented below. Specific improvements may be subject to design modification, as needed, to achieve the GHG emissions reduction based on the final building program and design. Other beneficial improvements or measures that are expected to result in further reductions of stationary source GHG emissions, but were not accounted for in the building energy model are also discussed. The Project was split into the following Project Components for building energy modeling purposes: Cambridge Center North Garage; Eleven Cambridge Center; Three Cambridge Center; and Whitehead Office Addition.[6]

Cambridge Center North Garage Office Buildings

Table 4-1 below provides a summary of the proposed building improvements assumed for the commercial office buildings to be constructed over the Cambridge Center North Garage.. Key energy savings features include more efficient building materials (walls), high efficiency HVAC system, high efficiency natural gas boilers, and lighting savings.

The total estimated annual electricity use and natural gas consumption, and associated emissions for the restaurants are presented in Table 4-1. Under the Base Case, the CO_2 emissions are estimated to be 3,389.0 tons per year. With the currently proposed building design and system improvements, the estimated energy use reduction for North Garage is 21.5 percent, which equates to a 13.5 percent reduction in stationary source CO_2 emissions when compared to the Base Case. The stationary source CO_2 emissions percent reduction for the North Garage under the Design condition was quantified as follows: 457.6 / 3,389.0 = 0.135 x 100 = 13.5%.

$$\textit{Reduction \%} = \frac{\textit{Emissions Reductions Due to Project Improvements (End Use Savings)}}{\textit{Project-Generated Emissions (Base Case Emissions)}}$$

This methodology is applied consistently to the remaining buildings to determine the percent reduction of stationary source emissions.

[6] The proposed conversion of 15,100 square feet of mechanical space into office space at the Broad Institute was not modeled given the de minimus energy usage and stationary source GHG emissions that would result from a small change in use.

Table 4-1 Cambridge Center North Garage Office Buildings Key Model Assumptions

Summary of Key Assumptions for Energy Model	Base Case	Design Case
Building Envelope (Construction Assemblies)		
Walls	R-value: 13, with Continuous Insulation adding 7.5 R	R-value: 13, with Continuous Insulation adding 10 R
Roof	R-value: 20	R-value: 30
Fenestration and Shading		
Fenestration Area	40%	69%
Vertical Glazing	Curtainwall-U: 0.45; SHGC: 0.4	Curtainwall- Low-E Double Pane Glass
HVAC (Air-side)		
HVAC System	Building: Floor-by-floor ASHRAE 62.1 Minimum Rates Garage: 0.75 CFM/SF; 24 hour operation, constant volume	Building: Dedicated OA System Garage: CO Control: VAV operation – 0.75 CFM/SF only 4 hours/day and 0.05 CFM/SF the remaining hours.
Space Heating/Cooling	Packaged Rooftop, Chilled Water Cooling; VAV with Reheat	Water Cooled AC; DX Cooling; Perimeter FPT with Reheat and EC Motors
System Efficiency	Chilled Water Cooling: 6.1 COP Chiller	At least 13 EER
HVAC (Water-side)		
Boiler Efficiency	80% Efficient Natural Draft	96% Efficient Condensing
Lights		
Interior Lighting	1.0 W/SF office; 0.2 W/SF Parking Garage	0.9 W/SF Office; 0.15 W/SF Parking Garage

Table 4-2 Cambridge Center North Garage Office Buildings Stationary Source CO_2 Emissions

	Energy Consumption			CO_2 Emissions		
	Electricity (MWh/yr)	Natural Gas (MBtu/yr)	Total (MBtu/yr)	Electricity (tons/ yr)[1]	Natural Gas (tons/ yr)	Total (tons/ yr)
Base Case	6,714.3	16,027.9	38,937.0	2,450.7	938.3	3,389.0
Design Case	6,910.4	6,987.3	30,565.7	2,522.3	409.0	2,931.3
End-Use Savings	-196.1	9,040.6	8,371.3	-71.6	529.23	457.7
Percent Savings			**21.5%**			**13.5%**

tons/yr = short tons per year

Eleven Cambridge Center Residential Building

Table 4-3 below presents a summary of the improvements that were included in the eQUEST model for the new Eleven Cambridge Center Residential Building. Key

energy savings features include high efficiency HVAC system, high efficiency condensing boilers, and lighting savings.

Table 4-3 Eleven Cambridge Center Residential Building Key Model Assumptions

Summary of Key Assumptions for Energy Model	Base Case	Design Case
Building Envelope (Construction Assemblies)		
Walls	R-value: 13, with continuous insulation adding 7.5 R	R-value: 13, with continuous insulation adding 13 R
Roof	R-value: 20	R-value: 25
Fenestration and Shading		
Fenestration Area	40%	64%
Vertical Glazing	Curtainwall/Storefront: U-value 0.42, SHGC 0.4	Low-E Double Pane Glass
HVAC (Air-side)		
HVAC System	PTAC: 9.3 < EER < 11	WSHP: Cooling EER > 12 and Heating COP > 4.2
	Floor-by—Floor: ASHRAE 62.1 Minimum Rates (fixed rates)	100% OA, VAV Energy Recovery Ventilator for corridors and toilet exhaust
HVAC (Water-side)		
Boiler Efficiency	80% Efficient Natural Draft	N/A
Lights		
Interior Lighting	Residential: 1 W/SF Retail: 1.7 W/SF	Residential: 1.0 W/SF Retail: 1.5 W/SF

The total estimated annual electricity use and natural gas consumption, and associated emissions for the hotels is presented in Table 4-4 below. Under the Base Case, the CO_2 emissions are estimated to be 1,712.8 tons per year. With the currently proposed building design and system improvements, the estimated energy use reduction for the new Eleven Cambridge Center Residential Building is approximately 32.8 percent, which equates to a 25.8 percent reduction (441.2 tpy) in stationary source CO_2 emissions when compared to the Base Case.

Table 4-4 Eleven Cambridge Center Residential Building Stationary Source CO_2 Emissions

	Energy Consumption			CO_2 Emissions		
	Electricity (MWh/yr)	Natural Gas (MBtu/yr)	Total (MBtu/yr)	Electricity (tons/ yr)[1]	Natural Gas (tons/ yr)	Total (tons/ yr)
Base Case	2,535.6	13,448.5	22,099.9	925.5	787.3	1,712.8
Design Case	2,708.0	6,741.5	15,981.4	988.4	394.7	1,383.1
End-Use Savings	-172.4	6,707.0	6,118.5	-62.9	392.6	329.3
Percent Savings			**27.7%**			**19.2%**

tons/yr = short tons per year

Three Cambridge Center Mixed Use Building

Table 4-5 below presents a summary of the improvements that were included in the eQUEST model for the new Three Cambridge Center Mixed Use Building. Key energy savings features include upgraded more efficient building materials (walls), high efficiency HVAC system, and high efficiency condensing boilers.

Table 4-5 Three Cambridge Center Mixed Use Building Key Model Assumptions

Summary of Key Assumptions for Energy Model	Base Case		Design Case	
	Residential	Commercial	Residential	Commercial
Building Envelope (Construction Assemblies)				
Walls	R-value: 13, with continuous insulation adding 7.5 R	R-value: 13, with continuous insulation adding 7.5 R	R-value: 13, with continuous insulation adding 13 R	R-value: 13, with continuous insulation adding 13 R
Roof	R-value: 20	R-value: 20	R-value: 25	R-value: 25
Fenestration and Shading				
Fenestration Area	40%	40%	64%	40%
Vertical Glazing	Curtainwall U: 0.45	Retail U: 0.45 Commercial U: 0.55	Curtainwall U: 0.38	Curtainwall U: 0.45
HVAC (Air-side)				
HVAC System	Packaged Rooftop, Chilled Water Cooling; VAV with Reheat with Min. Volume Setpoint of 40%	Packaged Rooftop, Chilled Water Cooling; VAV with Reheat with Min. Volume Setpoint of 40%	Energy Recovery Ventilator: Packaged Rooftop; DX Cooling and Gas Furnace	Water Cooled VPAC, DX Cooling; Perimeter FPT with Reheat and EC Motors
Efficiency	9.3 - 11 EER Efficiency	-	EER > 12	>13.0 EER Efficiency
HVAC (Water-side)				
Boiler Efficiency	80% natural draft	80% natural draft	96% Condensing	96% Condensing
Lights				
Interior Lighting	1 W/SF Units, 0.5 W/SF Corridors	1 W/SF Office, 1.7 W/SF Retail	1 W/SF Units, 0.45 W/SF Corridors	0.9 W/SF Office, 1.5 W/SF Retail

The total estimated annual electricity use and natural gas consumption, and associated emissions for the office building are presented in Table 4-6 below. Under the Base Case, the CO_2 emissions are estimated to be 2,057.4 tons per year. With the currently proposed building design and system improvements, the estimated energy use reduction for the new office building is approximately 27.0 percent, which equates to an 18.6 percent reduction in stationary source CO_2 emissions when compared to the Base Case.

Table 4-6 Three Cambridge Center Mixed Use Building Stationary Source CO_2 Emissions

	Energy Consumption			CO_2 Emissions		
	Electricity (MWh/yr)	Natural Gas (MBtu/yr)	Total (MBtu/yr)	Electricity (tons/ yr)[1]	Natural Gas (tons/ yr)	Total (tons/ yr)
Base Case	3,361.7	14,185.2	25,655.4	1,227.0	830.4	2,057.4
Design Case	3,500.9	6,792.6	18,737.8	1,277.8	397.6	1,675.5
End-Use Savings	-139.2	7,392.6	6,917.7	-50.8	432.8	381.9
Percent Savings			**27.0%**			**18.6%**

tons/yr = short tons per year

Whitehead Office Addition

Table 4-7 below presents a summary of the improvements that were included in the eQUEST model for the proposed commercial office expansion of the Whitehead Institute. For the purposes of the energy model, the office expansion was a split into 60 percent lab space and 40 percent office space in order to account for anticipated energy needs for potential laboratory space. Key energy savings features include improved building envelope, high efficiency condensing boilers, and lower lighting power densities.

Table 4-7 Whitehead Office Addition Key Model Assumptions

Summary of Key Assumptions for Energy Model	Base Case	Design Case
Building Envelope (Construction Assemblies)		
Walls	R-value: 13, with continuous insulation adding 7.5 R	R-value: 13, with continuous insulation adding 13 R
Roof	R-value: 20	R:value: 25
Fenestration and Shading		
Fenestration Area	40%	47%
Vertical Glazing	Curtainwall U: 0.45	Curtainwall U: 0.41
HVAC (Air-side)		
HVAC System	Package Rooftop, Chilled Water Cooling; VAV with reheat	Lab: Packaged Rooftop With ERV, Chilled Water Cooling, and VAV with HW Reheat Office: 4-pipe Fan Coil Units
CHW System		
Chiller Type	Rotary Screw	Variable Speed Fans
Chiller Efficiency	4.9 COP	6.1 COP
CHW Pump Control	One Speed Pumps	Variable Speed Pumps
Service Hot Water		
HW Boilers	80% Efficient Natural Draft	96% Efficient Condensing
HW Pump Control	One Speed Pumps	Variable Speed Pumps
Lights		
Interior Lighting	Office: 1 W/SF Lab: 1.4 W/SF Retail: 1.7 W/SF	Office: 0.9 W/SF Garage: 0.15 W/SF

The total estimated annual electricity use and natural gas consumption, and associated emissions for the Residential Expansion are presented in Table 4-8: Residential Expansion Stationary Source CO_2 Emissions. Under the Base Case, the CO_2 emissions are estimated to be 1,162.4 tons per year. With the currently proposed building design and system improvements, the estimated energy use reduction for the Residential Expansion is approximately 27.5 percent, which equates to a 22.8 percent (264.9 short tons) reduction in stationary source CO_2 emissions when compared to the Base Case.

Table 4-8 Whitehead Office Addition Stationary Source CO_2 Emissions

	Energy Consumption			CO_2 Emissions		
	Electricity (MWh/yr)	Natural Gas (MBtu/yr)	Total (MBtu/yr)	Electricity (tons/ yr)[1]	Natural Gas (tons/ yr)	Total (tons/ yr)
Base Case	1,491.5	10,556.6	15,645.5	544.4	618.0	1,162.4
Design Case	1,413.9	6,516.2	11,340.5	516.1	381.5	897.5
End-Use Savings	77.6	4,040.4	4,305.0	28.3	236.5	264.9
Percent Savings			**27.5%**			**22.8%**

tons/yr = short tons per year

Overall Project Emissions (Full Build)

The total estimated annual electricity use and natural gas consumption, and associated emissions for the Project (all buildings combined, or full build out) are presented in Table 4-9 below. Under the Base Case, the CO_2 emissions for the Project are estimated to be 8,321.6 tons per year. With the currently proposed building design and system improvements, the estimated CO_2 emissions are 6,889.8 tons per year which is a savings of 1,431.8 tons per year. The equivalent estimated energy use reduction for the Project is approximately 25.1 percent, which equates to an approximately 17.2 percent overall reduction in stationary source CO_2 emissions when compared to the Base Case. The reduction in stationary source CO_2 emissions is consistent with the Massachusetts Stretch Code.

Table 4-9 Stationary Source CO_2 Emissions for the Overall Project (Full Build)

	Energy Consumption			CO_2 Emissions (tons/yr)[1]		
Project Component	Base Case	Design Case	Percent Savings	Base Case	Design Case[2]	Percent Reduction
Cambridge Center North Garage Office Buildings	38,937.0	30,565.7	21.5%	3,389.0	2,931.3	13.5%
Eleven Cambridge Center Residential Building	22,099.9	15,981.4	27.7%	1,712.8	1,383.1	19.2%
Three Cambridge Center Mixed Use Building	25,655.4	18,737.8	27.0%	2,057.4	1,675.5	18.6%
Whitehead Office Addition	15,645.5	11,340.5	27.5%	1,162.4	897.5	22.8%
Total	**102,337.9**	**76,647.0**	**25.1%**	**8,321.6**	**6,889.8**	**17.2%**

tons/yr = short tons per year

Energy Use Index

The Energy Use Index (EUI) is a tool used to provide a common basis of comparison for energy use for various building uses. It is the total amount of energy used at a project over a one-year period, divided by the square footage of that building and represents the energy consumed by a building relative to its size. Based on the most recent Commercial Building End-Use Consumption Survey (CBECS), the average

office building is EUI 90 with a maximum of 35 recommended.[7] Table 4-10 below provides the EUI for each of the Project Components under the Base and Design Cases. These EUI's are well below the averages presented in the CBECS however, the CBECS is based on older buildings where the EUI presented herein represent more aggressive state building codes as well as aggressive mitigation measures to reduce the energy use and greenhouse emissions.

Table 4-10 Energy Use Index (kBtu/sf-yr)

Project Component	Energy Use Index (kBtu/sf-yr) Base Case	Design Case
Cambridge Center North Garage Office Buildings	50.9	40.0
Eleven Cambridge Center Residential Building	63.4	45.9
Three Cambridge Center Mixed Use Building	79.6	58.2
Whitehead Office Addition	229.7	166.5

Other Beneficial Stationary Source CO_2 Emissions Improvements

Building Reuse

There are significant GHG emissions associated with energy expended for new building construction from the materials manufacturing processes and transportation of those building materials as well as from construction equipment. By redeveloping an urban site and reusing the Cambridge Center North Garage instead of constructing all new parking structures to support the proposed uses, the Project further reduces GHG emission and the impact on the climate by preserving the embodied energy and carbon in the existing materials. Reuse of the garage equates to over 257 million BTUs of energy (or over two million gallons of gasoline) and approximately 27 short tons/year of CO2 emissions.[8]

Furthermore, the Redeveloper will make energy efficiency-related improvements, such as replacing inefficient lighting fixtures to the Cambridge Center North Garage in the future. Since these upgrades are not yet confirmed, they were not quantified as part of this stationary source GHG emissions assessment, but they can be assumed as beneficial measures to reducing CO_2 emissions under the future build condition.

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[7] Website link to article: http://greensource.construction.com/news/2012/04/120417-zero-energy-buildings-attainable-across-climates-researchers-say.asp

[8] Source: http://thegreenestbuilding.org/

Water Efficiency/Wastewater Generation Reduction

Water efficiency is not only important for conserving potable water and reducing wastewater generation, but also for reducing energy. Nationally, about four (4) percent of electricity use can be attributed to the treatment of potable water and wastewater, excluding the energy use associated with water heating. Therefore, the Proponents' commitment to reducing water use and wastewater generation through the installation of low-flow fixtures not only supports the overall sustainability goals, but further mitigates the potential impacts from energy use on the climate.

As outlined in the current MEPA GHG Policy, projects that will consume greater than 300,000 gallons per day (gpd) of water or wastewater may be required to model GHG emissions associated with energy usage for water or wastewater treatment on a case-by-case basis. This project will require 118,740 gpd of potable water and will generate 107,945 gpd of wastewater. Since the combined total of 226,685 gpd of water and wastewater is less than the screening threshold, therefore, no GHG analysis is needed.

Plug Loads

The Proponent commits to encouraging the use of ENERGY STAR appliances and equipment, where available and reasonably practicable. Additionally, it is anticipated that task lights will be installed with motion sensors and schedule systems in the commercial office spaces. The building energy model for the Design Case does not take credit for reduced plug loads because building users are not fully identified at this time and, therefore, it is not possible to accurately estimate the number and/or type of these appliances, which depend, in large part, on the nature of the ultimate building user types. However, the use of ENERGY STAR appliances and equipment has proven to result in a reduction in overall energy use and, therefore, a reduction in stationary source CO_2 emissions for the Project is anticipated.[9] To quantify this, a 10 percent reduction was applied to the total annual electrical output of the Miscellaneous [10] category derived from the eQUEST model for each Project Component to account for ENERGY STAR appliances and equipment. The total annual Miscellaneous electricity would be reduced from 4,329.2 MWh to 3,941.6 MWh, which equates to a reduction in 141.5 tons of stationary source CO_2 emissions. This results in an overall stationary source CO_2 emissions reduction of 18.9 percent for the Project and overall energy reduction of 26.4 percent.

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[9] Compared to standard office equipment and home appliances (non-ENERGY STAR- rated), ENERGY STAR-qualified products use 30 to 75 percent less electricity according to the ENERGY STAR website: http://www.energystar.gove/index.cfm?c=ofc

[10] The Miscellaneous category is one of the six categories eQUEST breaks electrical use into and the most applicable to plug-in loads.

Building Commissioning and Sub-Metering

The Proponent will consider the opportunity to conduct building commissioning. The intent of commissioning buildings is to improve the performance/efficiency of energy-related systems resulting in energy savings and GHG benefits. Enhanced commissioning, as defined by LEED, would also be implemented for the North Garage Office Buildings, Eleven Cambridge Center Residential Building, and Three Cambridge Center Mixed Use Building.

It is likely that commercial and residential tenants will be responsible for their own energy costs via lease agreements. By charging individual tenants for energy usage, the Redeveloper will have a better understanding of the energy profile, and can identify areas and specific systems for energy conservation measures and improvement. In addition, with direct payment and control of use, tenants leasing the building can encourage reduction in consumption of energy and water, and associated GHG emissions. The Proponent may explore and evaluate the costs associated with installing trackers or meters. The Proponent may also work with Eversource to design/employ high-efficiency equipment, where reasonable and feasible.

Utility Incentives

The Proponent will consider the use of LED lighting and/or efficient utility systems for the majority of the Project Components. Electrical service providers typically offer technical assistance and/or incentives when such measures are implemented. The Redeveloper has a strong working relationship with service providers and currently engages them to explore utility incentives and rebates for expanding energy efficiency measures for new construction projects. The Redeveloper plans to use this same approach for the Project.

"Green" Tenant Leasing/Guidelines

During the leasing process, the Proponent will provide Tenant Design and Construction Guidelines to potential office and retail tenants as a guide to use when fitting out their spaces. The intent of these guidelines is to educate future tenants about implementing sustainable design and construction features in their tenant improvement build-out as well as adopting green building practices that support the overall sustainability goals of the Project. The guidelines will also communicate the sustainable and resource-efficient features incorporated into the base building(s) and provide specific suggested sustainable strategies enabling tenants to coordinate their leased space design and construction with the rest of the building systems.

In summary, the lease guidelines may include the following information:

- Descriptions of sustainable design, construction and operations features of the proposed building(s), including resource conservation goals and features for tenant fit-out spaces (e.g., low-flow plumbing fixtures, sub-metered systems, lighting controls) as well as building certifications (i.e., LEED certification).
- Encourage tenant commitments for meeting various energy and water conservation goals.
- Descriptions of current regulatory requirements that pertain to leasable spaces.
- Possible strategies for energy efficiency, such as those for HVAC equipment recommendations, lighting/lighting controls, and low-flow/high-efficiency plumbing fixture recommendations may be included in the guidelines.
- Information on the various high performance building rating systems, such as EPA's ENERGY STAR, Green Globes, and LEED for Commercial Interiors (CI) as well as information on how the design case building(s) can contribute towards these certifications.
- Waste reduction goals and recycling facilities/programs.
- Information on Green Cleaning guidelines/policies.
- Information regarding Project-wide features that aim to encourage alternative transportation and TDM measures.
- Information on how to train/inform maintenance staff and employees on sustainable design/operation features.

Evaluation of Alternative Energy Sources

On-Site Renewable Energy

Rooftop Solar PV

The Proponent has conducted a preliminary evaluation of installing solar photovoltaic (PV) systems on the proposed building rooftops as the most practical and cost-effective application of on-site renewable energy for the Project. Table 4-11 presents a summary of the estimated solar power and associated stationary source GHG emissions reductions for the potential available rooftop area for North Garage, Eleven Cambridge Center, and Three Cambridge Center. The calculations for the solar power emissions savings is provided in the Appendix D of this NPC.

Table 4-11 Estimated Photovoltaic (Solar) Power

Project Component	Available Roof Area (sf)[1]	Estimated Annual Output (kWh)[2]	Annual CO_2 Emissions Savings (tons per year)
North Garage Office Buildings	20,832	337,444	256
Eleven Cambridge Center Residential Building	8,450	143,424	109
Three Cambridge Center Mixed Use Building	13,000	212,569	162
Whitehead Commercial Office Addition	6,208	102,178	78
TOTAL	**36,790**	**795,615**	**605**

1 Roof area available for solar PV installation excluding competing space requirements for the building rooftop mechanical units and proposed vegetated roof.
2 Assumes no obstruction to sunlight.

The solar PV systems for the Project could produce an estimated average annual energy output of approximately 795,615 kWh. This equates to an additional reduction of approximately 605 tpy of stationary source CO_2 emissions for the Project if PV system was installed on the respective buildings.

Solar PV availability will continue to be evaluated as the design progresses and as tenants and their needs are better identified. The Proponent understands the capacity of PV arrays continues to be roughly 10 watt/SF, which is an improvement over earlier versions of this equipment, but it is still lower than the average power draw of a multi-story office building (4-5 W/SF) or lab building (8-10 W/SF). The economics of installing solar PV continue to improve with tax credits available and the secondary renewable energy credits market available.

While solar PV provides the advantage of supplying power while generating zero GHG emissions during operation, the capacity limitations of the equipment prevent obtaining all the building power from local Solar PV sources. Furthermore, the Proponent will have to consider the City's setback and screening requirements for rooftop equipment, which may have a significant impact on the available area for solar PV.

While the Proponent is not committed to installing solar PV systems on the rooftops of the proposed buildings at this time, the Proponent commits to constructing all new buildings to be "solar ready", including designing the roof structure to support the weight and wind loads associated with solar energy collectors as well as providing space to accommodate associated infrastructure, including conduit to the roof and space in the electrical room for an inverter.

Wind (Architectural)

As design of each Project Component progresses, the Redeveloper may consider the feasibility of integrated wind harvesting systems for building energy into the building design.

Geothermal

There are several factors as to why geothermal energy, or Ground Source Heat Pumps (GSHPs), are not feasible for the Project. These include:

- The Project is located in a dense urban setting with subway tunnels and existing city and utility infrastructure running below the parcels.
- The well field area required to be cost-effective for the Project is large and the urban location makes it infeasible to install the GSHP system. Based on load estimates as noted below from the proposed case energy models, assuming each well is 3,000 feet deep and 30 feet apart; a well field of the approximate area of open land area as noted is required.
- The Cambridge Center North Garage occupies the majority of the ground plane prohibiting the inclusion of geothermal wells.

The above estimates are based on 350 foot per ton of cooling for office, 550 SF/ton for residential, and 200 SF/ton for lab, and 15 ton per well cooling available. Table 4-12 presents the number of geothermal wells and associated land area required for each Project Component.

Table 4-12 Land Area Required for Geothermal Wells

Project Component	Well Quantity	Acres of Land Required
Cambridge Center North Garage	115	2.54
Eleven Cambridge Center	34	0.76
Three Cambridge Center	48	1.04
Whitehead Office Addition	20	0.42

District Energy Opportunities

Steam

According to the "Guidance for the Application of the MEPA GHG Policy and Protocol to the Use of the Dalkia Cambridge CHP District Steam" document, MEPA allows the quantification of stationary source fuel consumption using of a source energy compliance path based on the results of site energy path modeling performed in compliance with the Stretch Energy Code and converted using the site to source

fuel conversion factors (SSFCF).[11] The site path energy modeling for all four buildings and the steps indicated in the guideline were used to evaluate the electricity generated and to calculate the CO2 emission reduction. The Dalkia steam approach needs more study; although the initial review seems to indicate small reductions in GHG generation due to the shared steam/electric generation, the costs are unclear and future flexibility is a concern. Further, the Project would be able to capture only the GHG reduction for electricity that corresponds to amount of steam purchased; it cannot be assumed that all electricity used on-site is generated by Dalkia locally, especially in the summer when local demand for steam is greatly reduced. Please refer to Appendix D for the detailed calculations.

Co-Generation/Combined Heat and Power

Co-generation, the combined generation of electricity and heat, will continue to be reviewed as the design progresses. The Proponent will evaluate whether it makes sense to locate a co-generation plant on one of the Project Component sites being proposed for redevelopment, or whether to take advantage of an opportunity to use the heat and electricity generated by the existing Biogen co-generation plant adjacent to the Project. Co-generation can be good in the fact that it uses fuel once to create both heat and electricity, which reduces fuel usage and GHG generation. However, it is the project team's experience is that co-generation makes sense economically only when both the electricity and the heat generated can be fully utilized by a project. For this reason, the co-gen capacity would be optimized and sized for the continuous background operating load of electricity with the corresponding heat requirement. This means that additional electricity, generated off-site, would be needed to serve the Project during peak usage periods. Residential uses usually do better with co-generation than commercial/office buildings because this use has both heating and domestic hot water requirements. Other uses, such as community centers, with swimming pools, showers, and laundry requirements, are ideal candidates for co-gen. Lab buildings that need reheat in order to temper large volumes of fume hood make-up air can also be good candidates, but this will depend on the tenants operations and space, and will need to be reviewed again as the design develops and as tenants are identified.

Kendall Square Eco-District

Kendall Square is experiencing growth in all sectors, from commercial and institutional development to residential projects. With Kendall Square responsible for one-third of energy consumption in Cambridge and continued growth placing certain pressures on existing infrastructure systems, the City, CRA, and key stakeholders in the Kendall Square community are looking at ways to make the area more sustainable and resilient. The EcoDistrict model streamlines sustainability efforts through an integrated approach that emphasizes projects at the district or neighborhood scale.

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[11] Guidance for the Application of the MEPA GHG Policy and Protocol to the Use of the Dalkia Cambridge CHP District Steam as a Fuel Source, Draft from March 11, 2014

EcoDistricts offer a new model of public-private-civic partnership with an emphasis on innovation, transparency, and collaborative action. The framework for the EcoDistrict process provides a management and monitoring framework to help stakeholders navigate planning, project delivery and performance over time of efforts that will move Kendall Square forward to become a sustainable and resilient district.

Since May 2013, the Kendall Square EcoDistrict stakeholder committee has been collaboratively working towards establishing an EcoDistrict governance structure along with specific goals, metrics and projects for Kendall Square. The stakeholder group includes the Proponent, the City, property owners, real estate developers, local institutions, businesses, community leaders and the Kendall Square Association. This group has hired a project manager, the consulting firm Linnean Solutions, to facilitate and manage the process. The group is utilizing the EcoDistrict process to work towards more efficient and sustainable energy and water infrastructures, stronger ties within the community, enhanced public space and connections to surrounding neighborhoods, and a stronger ecosystem and natural habitat.

The Stakeholder Group is focusing on four phases of EcoDistrict development: District Organization, District Assessment, District Projects, and District Management. Linnean Solutions is working with the stakeholder group to identify the major priorities, goals, and metrics for the EcoDistrict, which will lead to collaborative district-scale projects for the Kendall Square area.

In June 2014, the Kendall Square EcoDistrict was included as part of the EcoDistrict.org Target Cities Program, joining eight other North American cities in a program to amplify and accelerate district-scale community regeneration and create replicable models for next-generation urban revitalization. The partnership with the Target Cities program brings together EcoDistricts.org staff to collaboratively work with Stakeholders to move the EcoDistrict process forward in Kendall Square. And, in spring of 2015, the Kendall Square EcoDistrict is conducting a large-scale district assessment process and is managing a comprehensive district energy assessment and analysis.

The eco-district would provide additional opportunities for combined heat and power and shared generation, provided projects are co-located that can utilize the heat and power generated. The eco-district is intended to incorporate renewable energy generation, and should promote combined/cooperative development with shared information about project needs and contributions. Ideally, the eco-district will apply the concept of “live-work-play” in order to reduce auto transportation and promote human powered transportation. Finally, the eco-district should provide a framework for the utilities, the City, and the developers to work together to right size projects and infrastructure, with a goal of minimizing energy usage, water usage, and greenhouse gas generation.

Mobile Source Emissions Assessment

Mobile source GHG emissions are based upon the traffic volumes, the distance traveled and GHG emission rates. The mobile source emissions are calculated by performing a yearly mesoscale analysis to evaluate the changes in CO_2 emissions for the existing and future conditions within the traffic study area. The GHG mobile source analysis estimates the area-wide CO_2 emissions from vehicle traffic for a time period of one year. Mobile source emissions were calculated by performing an annual GHG emissions mesoscale analysis to evaluate the estimated change in CO_2 emissions for the existing and future conditions within the study area. The mobile source CO_2 assessment was conducted for the Existing, No-Build, Build and Build with Mitigation Conditions, as described below.

Analysis Conditions

This NPC compares the future No-Build and Build conditions in order to identify the potential impact from the Project. Where applicable, the existing conditions are considered for comparison. In order to compare the effects of the proposed Project, the following analysis conditions were identified:

- **Existing Condition** represents the year 2014, the baseline analysis condition for comparison to future conditions;
- **No-Build Condition** represents the year 2024 and reflects existing traffic volumes increased to account for anticipated background traffic volume growth, and includes traffic related to specific development projects within the study area that are expected to be completed by 2024, and assumes no Project-related vehicle trips;
- **Build Condition** represents the year 2024 and includes the No-Build Condition traffic volumes plus the traffic associated with the Full-Build of the Project;
- **Build with Mitigation Condition** represents the 2024 Build Condition with the Project fully constructed and in operation with proposed transportation-related mitigation measures in place.

Future conditions were selected to reflect a ten-year traffic planning horizon. A comparison between the No-Build and Build Conditions of the same year show changes anticipated to occur as a result of the Project.

Mobile Source Emission Rates

EPA's Office of Transportation and Air Quality (OTAQ) has developed the Motor Vehicle Emission Simulator (MOVES)[12]. MOVES2014 is U.S. Environmental Protection

[12] MOVES2014 (Motor Vehicles Emission Simulator), 2014, US EPA, Office of Mobile Sources, Ann Arbor, MI.

Agency's (EPA's) latest motor vehicle emissions model for state and local agencies to estimate greenhouse gases from cars, trucks, buses, and motorcycles.

All the vehicle emissions used in the mobile source GHG analysis were obtained using EPA's MOVES2014 emissions model. MOVES2014 calculates emission factors from motor vehicles in kilograms per vehicle-mile for existing and future conditions. The emissions calculated for this air quality assessment includes elements such as Tier 3 emission standards (which is an EPA program that sets new vehicle emissions standards, lowering the sulfur content of gasoline), heavy-duty engine and vehicle greenhouse gas regulations (2014-2018), and the second phase of light-duty vehicle GHG regulations (2017-2025). It also includes Massachusetts-specific conditions, such as the state vehicle registration age distribution and the statewide Inspection and Maintenance (I/M) Program.[13]

Traffic Data

The air quality study used traffic data (volumes, delays, and speeds) developed for each analysis condition. The mesoscale analysis for CO_2 emissions used a yearly traffic volume for weekday and weekend periods. The vehicle miles traveled data used in the air quality analysis were developed based on the traffic data analyzed in this NPC. The mobile source GHG study area includes the entire Middlesex County.

Existing Mobile Source CO_2 Emissions

Table 4-13 presents CO_2 emissions from mobile sources under all conditions. The calculation of Existing Conditions mobile source emissions provides a base for which future years are evaluated. The mobile source analysis calculated the existing CO_2 emissions from the major roadways in the study area and represents Middlesex County. These emissions, estimated to be 5,745,642 tons per year, establish a baseline to which future emissions can be compared.

Future Mobile Source CO_2 Emissions

Future Project-related mobile source CO_2 emissions calculations are based upon changes in traffic and emission factor data. The traffic data includes traffic volumes, vehicle miles traveled, roadway operations, and physical roadway improvements. The emission factor data included emission reduction programs and years of analysis.

The mobile source analysis estimated the future study area CO_2 emissions due to the changes in traffic and emission data. Under the No-Build Condition, CO_2 emissions

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6 *The Stage II Vapor Recovery System* is the process of collecting gasoline vapors form vehicles as they are refueled. This requires the use of a special gasoline nozzle at the fuel pump.

were estimated to be 5,542,707 tons per year. Under the Build Condition, the CO_2 emissions were estimated to be 5,543,753 tons per year.

The total Project-related mobile source GHG emissions are 1,046 tons per year, as presented in Table 4-13 below. The 1,046 tons per year increase in CO_2 emission represents a 0.02 percent increase in CO_2 emissions for the Middlesex County area for future 2024 conditions.

Table 4-13 Mobile Source CO_2 Emissions Analysis Results (tons per year)

Pollutant	2014 Existing Conditions	2024 No-Build Conditions	2024 Build Conditions	Project-Related CO_2 Emission[1]
Greenhouse Gas (CO_2)	5,745,642	5,542,707	5,543,753	1,046

1 Represents the difference in CO_2 emissions between the Build and No-Build Conditions.

Proposed Mitigation Measures

The mobile source GHG emissions assessment calculated the GHG emissions for the Project-related mobile sources. As discussed in Chapter 2, *Transportation and Parking* of this NPC, the Proponent will coordinate with the City to potentially implement intersection improvements to reduce delays and queuing as well as implement TDM measures in order to reduce single-occupant vehicle trips to the KSURP area and to minimize peak-period traffic demands in the KSURP area—all of which will provide for mobile source CO_2 emissions benefits. For the purposes of quantifying mobile source GHG emissions and projected reductions as a result of traffic-related improvements, this assessment assumed the local intersection operation improvements, bicycle and pedestrian enhancements, and TDM Plan, as described in Chapter 2, *Transportation and Parking*.

Based on the new requirement to use MOVES2014 and the corresponding regional nature of the mesoscale analysis, the emissions related to Project-specific improvements, such as the intersection improvements and TDM program are minor reductions relative to the overall area (which are projected on a county-wide level). The implementation of the TDM program is expected to improve air quality in the study area by promoting the use of alternative forms of transportation to the use of single-occupant motor vehicles as the principal travel mode to and from the KSURP area. Previous estimates of similar TDM programs have ranged on the order of two to five percent reduction in vehicles miles traveled (VMT), which in turn will have a slight decrease in regional greenhouse gas emissions from the Build condition.

The proposed traffic mitigation (physical and operational upgrades at the intersections) is projected to reduce CO_2 emission by an estimated 102 tons per year, which results in a total Project-related CO_2 emissions of 941 tons per year. Table 4-14 below presents a summary of the projected emissions reduction related to the traffic mitigation.

Table 4-14 Mobile Source CO_2 Emissions Mitigation Analysis Results (tons per year)

Pollutant	Project-Related CO_2 Emission[1]	Estimated Reductions Due to Traffic Mitigation[2]	Resulting Project-Related CO_2 Emissions
Greenhouse Gas (CO_2) Emissions	1,046	105	941

1 Represents the difference in CO_2 emissions between the 2024 Build and No-Build Conditions
2 The traffic mitigation includes the physical and operations upgrades at the intersections and does not include TDM programs which would result in minor additional emissions reductions.

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements (the proposed ETMP) designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation and associated mobile source GHG emissions projected to result from the Project. The ETMP will be developed in conjunction with the many stakeholders engaged in transportation planning and operations in Kendall Square, including the Kendall Square Mobility Task Force, the MBTA, and MassDOT. The ETMP would supplement the transportation mitigation measures outlined in Chapter 2.

Climate Change Adaptation

During the early stages of project planning and design, the Proponent has begun to consider potential climate change impacts and plan for resilience. This section provides an evaluation of potential impacts to the KSURP area associated with predicted sea level rise, increased frequency and intensity of precipitation events, and extreme heat events. The draft MEPA Climate Adaptation & Resiliency Policy issued in September 2014 was used as guidance. Furthermore, the City is currently preparing the Cambridge Climate Change Vulnerability Assessment, which will be referred to by the Proponent as the design of each Project Component moves forward.

Future Potential Sea Level Rise/Flooding

To fully evaluate the KSURP area's susceptibility to flooding from precipitation, coastal surge events, and sea level rise a detailed dynamic model is required which can compile the available data and determine the probability and severity of flooding from the three sources relevant to this discussion. Such a model is currently being developed by MassDOT to assess risks to the Central Artery. The City is working with MassDOT to extend the study area into Cambridge and incorporating the results into the Cambridge Climate Change Vulnerability Assessment. MassDOT's Advanced Circulation (ADCIRC) model, with Cambridge's input, will account for flooding in the context of climate change, coupled with the complex topography of the City and the area between Cambridge and Boston Harbor. It will produce probabilities of

flooding throughout the City at a resolution of 50 square meters for the present day, as well as the years 2030 and 2070. The modeling effort has not been completed at the time of publishing this document. The single EIR, if granted, will include an assessment of additional information made available from the Climate Change Vulnerability Assessment. The following investigation was completed to better understand the underlying exposure to flooding of the Project Component sites in lieu of the City's assessment.

The Kendall Square neighborhood is vulnerable to flooding through several means, the first of which is the Charles River. The Charles River Basin has the capability of inundating the KSURP area in extreme weather events, especially when coupled with sea level rise. The Charles River Basin elevation is set by sluice gate operations at the Charles River Dam constructed in 1910 at the Museum of Science and pumping from the New Charles River Dam adjacent to the Zakim Bridge constructed in 1978. A U.S. Army Corps of Engineers (USACOE) Report determined the stillwater elevations immediately upstream of the Charles River Dam for the 100-year and 500-year precipitation events to be elevation +3.5' and +5.2' NAVD 88[14], respectively. The FEMA Flood Insurance Study for the Kendall Square map unit (Map 25017C0577E), denoted that the Cambridge is susceptible to flooding when Charles River Basin elevations are above +4.6' NAVD 88. It also indicates that the New Charles River Dam can maintain the 100-year storm at elevation +4.35' NAVD 88, in moderate contradiction to the USACOE report. These dams could be vulnerable to overtopping, as well as flanking, from Massachusetts Bay through storm surge and sea level rise.

An evaluation of the FEMA flood maps for the Charles River Basin was conducted to understand the limits of the 100-year floodplain. The KSURP area is located within the limits of FEMA flood insurance rate map (FIRM) 25017C0577E. Refer to Figure 4.1 for the Cambridge limits of the 100-year floodplain which is at elevation +4 feet NAVD 88, which is rounded down from +4.35 feet, the previously discussed 100-year elevation set by basin pumping. No preliminary FIRM updates have been prepared for Cambridge as the Charles River dams are meant to maintain the Charles River Basin elevations. However, this is not true downstream of the dams. The preliminary, but not effective 100-year flood elevation downstream of the Charles River and New Charles River dams are elevations +10 feet and +13 feet NAVD 88, respectively. The difference in flood elevation is due to the New Charles River dam being subject to coastal flooding and wave action. For the purposes of this study, the 100-year flood elevation of +10.0 feet NAVD 88 will be used. Refer to Figure 4.2 for the adjacent Boston FIRM detailing the Charles River 100-year floodplain on either side of the Charles River Dam. The New Charles River Dam was designed to withstand overtopping from sea levels up to +11.6 feet NAVD 88 making it vulnerable to the extreme storm event. On the contrary, the original Charles River Dam height is +14.6 feet NAVD 88, with only the sluice gates at risk of overtopping during the 100 year storm event. Therefore, Charles River Basin flooding from overtopping is limited to

[14] To convert elevations in NAVD 88 to Cambridge City Base add 11.65'

the quantity of water that is able to overtop the 90 linear feet of sluice gate, as opposed to the 1200-foot length of the entire dam. In addition to overtopping, the Charles River Dams are subject to flooding via flanking, where water from an extreme surge event bypasses the dams by overland routes adjacent to the dam ends. To evaluate the effect of flanking a detailed topographic analyses is required.

The Proponent has also evaluated the findings outlined in *Sea Level Rose: Understanding and Applying Trends and Future Scenarios for Analysis and Planning* prepared by the Massachusetts Office of Coastal Zone Management. Potential sea level rise scenarios were evaluated by CZM for four different climate change scenarios in Boston, Massachusetts, which can be used as a proxy for Cambridge. The climate change scenarios produce a range in sea level rise from 0.81 feet to 6.83 feet in the year 2100, between the Lowest and Highest scenarios, with Intermediate Low and Intermediate High scenarios being established at 1.91 feet and 4.20 feet, respectively. Comparatively, the Cambridge Climate Change Vulnerability Assessment team uses the National Climate Assessment Intermediate High and Highest sea level rise curves (3.9 and 6.6 feet by 2100), a decision based on the current emissions trajectories.

The CZM sea level rise estimates were applied to the 100-year flood elevation downstream of the Charles River Dam at elevation +10.0 feet NAVD 88 previously discussed. Should the expected sea level rise exceed the top of the New Charles River Dam at elevation +11.6 feet NAVD 88, then the Project may become vulnerable to coastal events if the pumping capacity of the dams is insufficient. The climate change scenarios produce the following elevations in future sea level rise from the preliminary 100-year flood plain elevation at the Charles River Dam:

- Lowest Scenario – Elevation +10.81 feet NAVD 88
- Intermediate Low Scenario – Elevation +11.91 feet NAVD 88
- Intermediate High Scenario – Elevation +14.20 feet NAVD 88
- Highest Scenario – Elevation +16.83 feet NAVD 88

The Charles River Dam would only be overtopped by the Highest Scenario for sea level rise, by a potential height of 2.23 feet. In the Lowest through Intermediate High scenario, Basin flooding will be limited to the quantity of water able to overtop the limited length of sluice gates. As a typical commercial building design lifecycle is only 50 years, the design team is not likely to adopt the 2100 Highest Scenario for sea level rise. The 2075 Highest Scenario may be more appropriate and places the 100-year flood event at elevation +13.92 feet NAVD, with 3.92 feet of rise according to the CZM report. This elevation is still lower than the Charles River Dam. It's worth noting that the New Charles River Dam is susceptible to overtopping by all CZM scenarios but the Lowest, which may further exacerbate the flood elevations experienced by the original Dam. Overtopping of the Charles River Dam will not directly translate to an increase in the elevation of the Charles River Basin. The actual flood elevation, and its relation to the Project, will be based on a number of factors including the actual height the dam is overtopped, the extent of flanking, the rate at which water overtops and

flanks the dam, the duration of the storm, and volume of hydrologically connected land below the minimum elevation of the KSURP area.

The KSURP area has an elevation between +6.0 feet and +12.0 feet NAVD 88 with building finished floor elevations around +10 feet NAVD 88, as determined by the Massachusetts (Boston Area) LiDAR data which has an accuracy of +/-0.5 feet. Therefore, the KSURP area as a whole is not currently believed to be susceptible to the 100- or 500-year precipitation event from the Charles River Basin, with flood elevations of +4.35 feet and +5.2 feet NAVD 88. On the other hand, the Charles River Dam is susceptible to sluice gate flooding from the 100-year coastal event. The entire Dam could be overtopped by a 100-year event if the Highest Scenario of sea level rise comes is realized. The ultimate flood elevation for the 100-year flood event with overtopping cannot be determined by the addition of water elevations, based on a so-called "bathtub model" approach. A dynamic model is required to balance the incoming water, which is a function of many things including twice-daily tide shifts, wave action, and the flooding elevation, with outgoing water, which is a function of pumping capacity. It is worth noting that the Project is also potentially susceptible to flooding from the Mystic River. The most concerning flood pathway for the KSURP area, according to the Climate Vulnerability Assessment team, is via overland flow downstream of the Amelia Earhart Dam. In addition, overland coastal flooding routes through Boston and overtopping and flanking at the Earhart Dam, could the severity of flooding at the KSURP area.

In addition to the above discussed flooding, the Project will also be subject to localized flooding given the capacity issues of the Cambridge Combined Sewer System. As the stormwater system is overwhelmed by precipitation and inundation from the coast/Charles River Basin, flows can be transferred to the combined system which also experiences groundwater infiltration. When the capacity of both systems are exceeded, surface ponding will occur to varying degrees. East Cambridge is subject to inland flooding for the current 100-year flood, which is expected to be exacerbated with climate change and sea level rise. These localized flooding issues will need to be addressed as the design of each development progresses, which includes coordination with the PWD to determine appropriate mitigation efforts. The City's ADCIRC model will eventually be coupled with inland flooding and inundation to further refine probabilistic flooding scenarios. Evaluation of each Project Component will be performed with the Cambridge Climate Change Vulnerability Assessment once publicly available.

The same methodology for evaluating building vulnerability to sea level rise can be applied to the adjacent roadway networks. Generally, the roadways are about one foot below the building elevations. Adjacent to the Project Component sites, Broadway has local low points around elevation +7 feet NAVD 88, while Main Street is about elevation +8 feet NAVD. Galileo Galilei Way ramps up from elevation +8 feet to +10 feet NAVD 88 near the KSURP area. The Kendall Square MBTA station may also be vulnerable to these flooding scenarios, which would affect the accessibility of the Project. Again, a dynamic model is required to truly evaluate the location and

severity of flooding from the combined effects of precipitation, coastal surges, and sea level rise. Local inland flooding will also be a function of existing infrastructure capacity and drainage patterns which will be addressed during the individual design developments of the Project with coordination from the DPW.

Extreme Weather Events

The ASHRAE 90.1-2010 energy standard continues to recommends a design temperature of 7°F winter and 87°F summer for the Boston area. These temperatures are based on historic averages, and represent the outer limits of temperatures that will be experienced in 99 percent of the year. This means that just 1 percent of the year, or 87.6 hours annually, will be colder than 7°F, or warmer than 87°F.

Projects regularly use these temperatures to design the HVAC system heating and cooling capacity; projects also regularly apply a safety factor (usually 10 percent) to the load calculated using these temperatures, and then equipment is selected using the smallest unit with capacity exceeding the calculated load. This means that the actual operating temperature range for the building (assuming just the safety factor is applied) can be considered 88°F annually, rather than 80°F annually, as recommended by the standard, potentially boosting operability down to 3°F and up to 91°F. Further, projects often select multiple units to provide for redundant capacity and operability when units are out of service; this provides additional capacity that can be used for periods of extreme temperatures.

Resiliency and Adaptation Measures to be Considered

The Proponent and project design team plan to use the results of the Cambridge Vulnerability Assessment as well in input from the Cambridge Department of Public Works (DPW), to evaluate potential design elements to mitigate the effects of potential sea level rise at the KSURP area as the design of each Project Component progresses. These mitigation efforts could include locating critical infrastructure above the first floor level (i.e. transformers, switchgear rooms, and mechanical rooms), limiting basement areas, and evaluating raised finish floor elevations and other improvements that may mitigate potential flooding.

Potential Site Design Measures

The Proponent is planning to implement a comprehensive set of site design measures aimed at making each Project Component less vulnerable to climate change. These measures will work in combination with building design measures to increase the building's resiliency. As part of the sanitary sewer connection requirements discussed in later chapters, each development of the Project will be required to store one day's worth of wastewater flow on-site, protecting the newly constructed buildings from backups which are a symptom of the limited capacity in the combined sewer system

which services Cambridge. In addition, the Project will be infiltrating a significant amount of stormwater as part of the Cambridge stormwater requirements to be discussed in later sections. Improving the hydrologic condition on-site will make the site more resilient to flooding, as stormwater is slowed and diverted from interfering with building operations through landscaped areas and infiltration systems. Both the sanitary storage and stormwater improvement features insulate the developments from potential issues due to climate change, while simultaneously improving the Cambridge infrastructure's ability to cope with extreme weather phenomena. To cope with increasing intensity in precipitation, stormwater infrastructure will be evaluated for capacities to handle short-duration, high intensity rain events, including inlet and piping capacities.

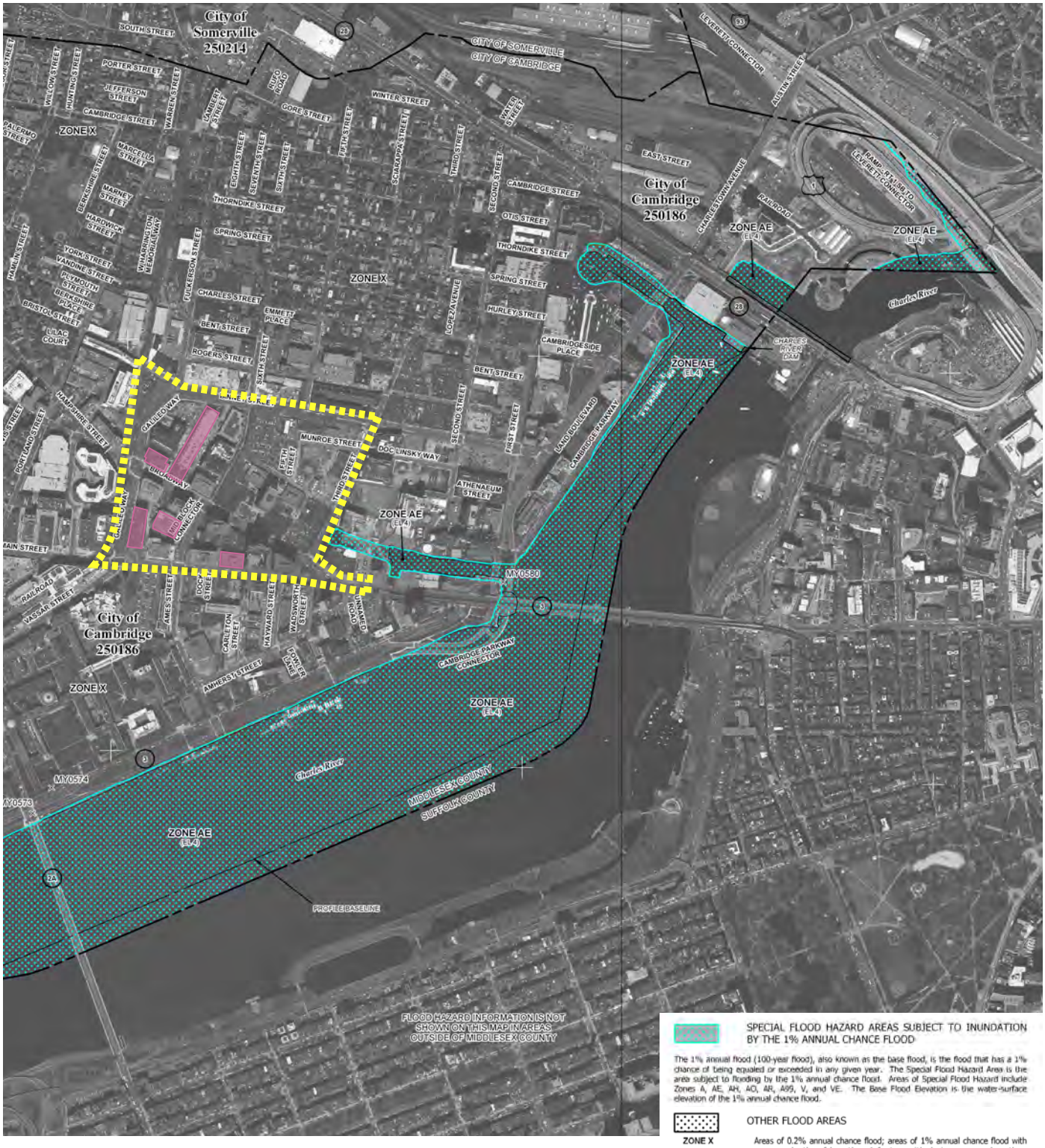
Additional site measures will be implemented to mitigate the effects of a warmer climate with longer dry spells. Increased pervious/green area at the ground level are all ways the Project will help reduce elevated temperatures associated with Heat Island Effect. Landscaping will be designed to create a positive and comfortable microclimate by segregating large areas of impervious, heat trapping materials, providing tree canopy cover for pedestrians and low level plants, and encouraging evaporative cooling with dense greenery and water features where practical. Vegetation will predominantly be native species to minimize irrigation requirements while efficient irrigation systems will be used to maintain landscape features during droughts. The practicality of rainwater harvesting for irrigation, xeriscaping (landscaping without irrigation), and incorporating green roofs will be explored as designs progress

Potential Building Design Measures

The North Garage Office Buildings will be built over an existing garage structure minimizing the ground floor exposure to the effects of extreme weather events. Flood prevention techniques could include: sealed wall penetrations for cable and electrical lines, watertight door barriers, septic line backflow prevention valves and sump pumps and discharge pumps, which could be connected to auxiliary external generator connections or resilient backup power.

Heating, electrical, and vulnerable equipment will be located to higher floors. Also, raising electrical outlets above anticipated flood levels will be considered.

The Project will incorporate green roofs/roof gardens, roofing membrane with High Solar Reflectance Index (SRI) to reduce solar heat gain to minimize air conditioning loads as well as high-performance curtain wall to maximize views and daylighting of interior spaces to reduce overall lighting loads.



KSURP Boundary

Proposed Project Component

Note: This graphic is a modified version of the FEMA Flood Insurance Rate Map #25017C0577E, Panel 577 of 656, effective June 4, 2010

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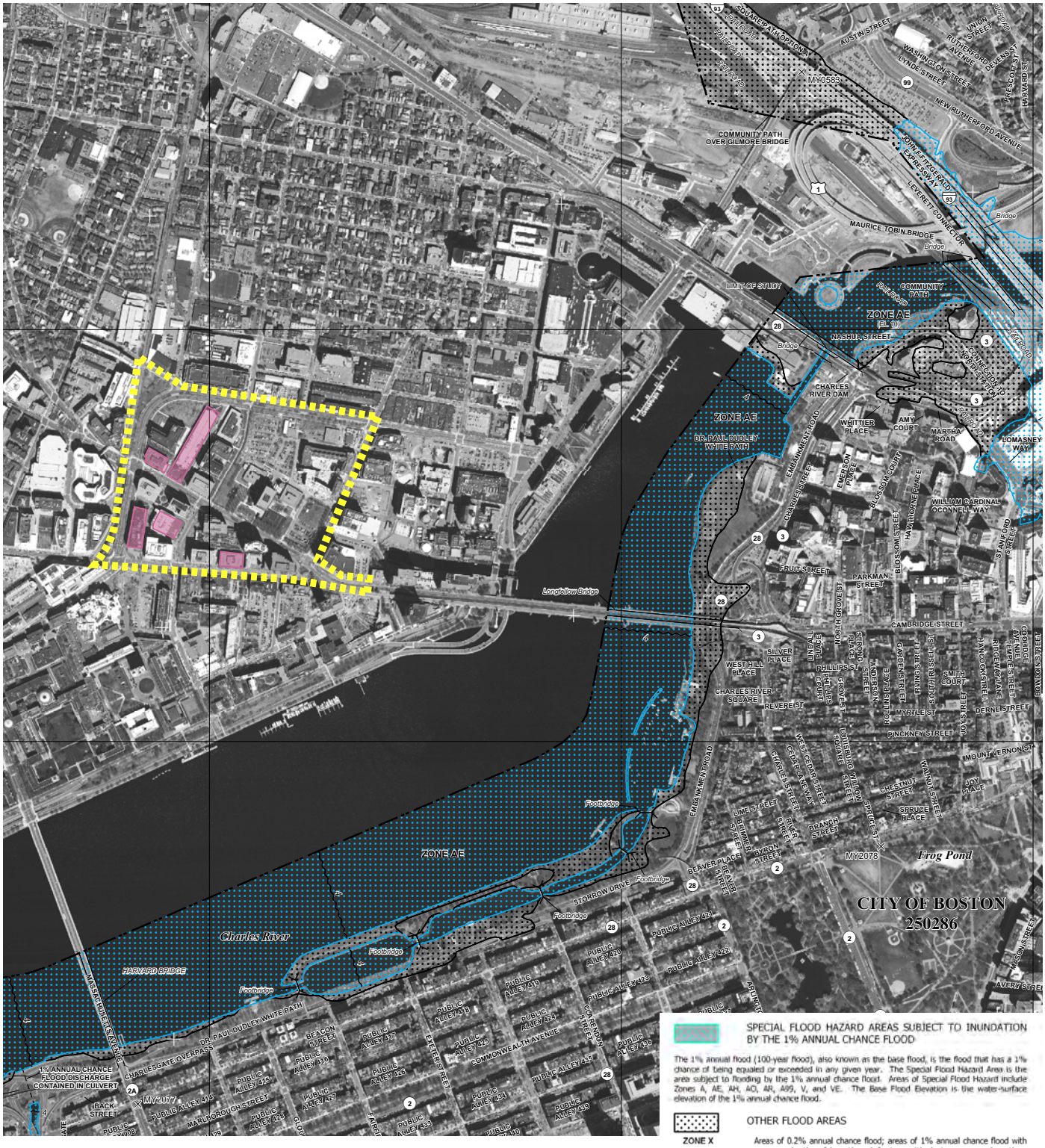
Figure 4.1
FIRM Flood Insurance Rate Map, Cambridge & Somerville

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: National Flood Insurance Program



Note: This graphic is a modified version of the FEMA Flood Insurance Rate Map #25025C077J, Panel 77 of 176, preliminary November 15, 2013

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Figure 4.2
FIRM Flood Insurance Rate Map, City of Boston

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: National Flood Insurance Program

5

Stormwater Management

Introduction

The following chapter describes the existing and proposed drainage conditions as well as how the Project may impact or improve these conditions. The site design for each Project Component site will consider existing drainage conditions to ensure that all redevelopment activities will fully comply with all applicable regulatory requirements. Much of the existing utility systems in the KSURP area were rebuilt in the 1960's and 1980's in the initial implementation of the urban renewal project. In addition, the City has invested significant funds to increase stormwater capacity in the Kendall Square neighborhood in recent years, and has several projects planned to continue increasing local capacity. This Project, as infill development in an already densely developed urban area, will benefit from the recently upgraded infrastructure and aim to support the City's plans to further improve neighborhood stormwater conditions.

Summary of Project Change Impacts

Each Project Component site has an existing building covering much of the parcel area, with the remainder a mix of hardscape and landscape. The Cambridge Center North Garage will be reconstructed to incorporate additional office and innovation space in two new towers atop the existing parking structure (Cambridge Center North Garage), which will be maintained to support the redevelopment. The existing building at Eleven Cambridge Center will be replaced by a mixed use commercial tower. At Three Cambridge Center, a residential office will replace the existing building.

As with past developments within the KSURP area, each Project Component will largely maintain the existing drainage replacing existing impervious rooftop and hardscape in kind on-site. The Project will be required to mitigate stormwater runoff to comply with City and MassDEP standards. Stormwater infrastructure will be designed and installed for each Project Component to reduce the runoff discharge rate

and improve the quality of the runoff to the City's stormwater system and the Charles River basin. The incorporation of green roofs and rainwater harvesting tanks into building design will be considered.

Regulatory Context

In March 1997, DEP adopted a new Stormwater Management Policy to address non-point source pollution. In 1997, DEP published the Massachusetts Stormwater Handbook as guidance on the Stormwater Policy, which was revised in February 2008. The Policy prescribes specific stormwater management standards for redevelopment projects, including urban pollutant removal criteria for projects that may impact environmental resource areas. Compliance will be achieved through the implementation of Best Management Practices (BMPs) in the stormwater management design. The Policy is administered locally pursuant to MGL Ch. 131, s. 40. A brief explanation of each Policy Standard and the system compliance is provided under the 'Proposed Conditions' section below.

In addition, the City requires a thorough site plan review process, which includes stormwater management requirements following the LID design guidelines. City stormwater rate and flow requirements are more rigorous than those required to be addressed by the DEP Stormwater Management Policy. Specifically, effluent stormwater rates for the post-development 25-year design storm must be reduced to equal the pre-development 2-year design storm rates. In addition, 80 percent of Total Suspended Solids (TSS) must be removed from stormwater effluent thereby lessening the Project's impact on the City's stormwater infrastructure and Charles River. Each Project Component will be required to meet these regulations as discussed below.

Existing Drainage Conditions

Figure 5.1 illustrates the existing drainage and combined sewer systems serving the KSURP area. The Project is located in a densely developed urban area consisting almost entirely of impervious rooftops and impervious paved surfaces. The DPW owns and maintains an extensive system of catch basins, manholes, and drain pipes in the area immediately adjacent to each Project Component site. The drainage system in this area drains to specific parts of the Charles River.

The storm drainage system serving the several developments under this Project drain to the Charles River. The surface drainage on Main Street, Broadway, Binney Street, and Galileo Galilei Way drain to the 54-inch Stormwater Outfall in the Charles River at Broad Canal Way.

The following is a list of drain services adjacent to each Project Component (Figure 5.1):

Cambridge Center North Garage

- A 24-inch main in Binney Street
- A 12-inch main in the pedestrian walk
- A 54-inch main in Broadway

Eleven Cambridge Center

- A 54-inch main in Broadway

Three Cambridge Center

- 21-inch main in Main Street
- 18-inch main in Main Street

The existing stormwater discharge rates are not currently known, as the limits of the proposed work is not expressly defined at this time. As the KSURP area is predominantly impervious, discharges are representative of a highly developed urban area in rate and water quality. The Project Components will define their respective existing drainage conditions and proceed to design stormwater infrastructure as required to meet both City and MassDEP standards.

At this point in time, the Proponent is aware of some minor flooding risk from severe precipitation events surcharging the existing drainage system. As part of this Project, the Proponent will coordinate with the DPW to determine the source of this inland flooding and whether or not this Project can decrease this risk to surcharging. In addition, the Proponent will discuss the possibility of improving system infrastructure in lieu of meeting DPW's stringent stormwater reduction standards.

Proposed Drainage Conditions

The following section describes the proposed groundwater recharge measures in order to comply with the local and state requirements for stormwater management. This section also addresses how the Project will comply with the applicable City stormwater requirements and MassDEP Stormwater Management Policy. Where possible, the Proponent will coordinate with the City to explore creative solutions to stormwater management that go beyond the scope of individual Project Components to provide a more district-wide solutions.

Stormwater Management Measures

Each Project Component will be designed in accordance with City and MassDEP stormwater standards. As the limits of the developments have not been set, stormwater control measures will be investigated as each Project Component

undergoes their respective design processes. The Proponent will consider several stormwater quantity and quality control measures as part of this process. These control measures include but are not limited to the following:

- Subsurface infiltration systems
- Green roofs
- Rainwater harvesting
- Permeable pavements
- Proprietary treatment devices
- Bioretention landscaped areas and streetscape design
- Deep sump, hooded catch basins

Compliance with MassDEP Stormwater Management Policy

Standard #1: *No new stormwater conveyances (e.g., outfalls) may discharge untreated stormwater directly to or cause erosion in wetlands or waters of the Commonwealth.*

Compliance: The proposed designs are intended to comply with this Standard. No new untreated stormwater will be directly discharged to, nor will erosion be caused to wetlands or waters of the Commonwealth as a result of stormwater discharges related to the proposed Projects.

The Proponent is exploring rainwater harvesting tanks, subsurface stormwater infiltration systems and the incorporation of green roofs as potential stormwater control measures. It is the Proponent's intention to treat runoff through the options listed above or through mechanical treatment units prior to discharge into the public storm drain system.

Standard #2: *Stormwater management systems must be designed so that post-development peak discharge rates do not exceed pre-development peak discharge rates.*

Compliance: The proposed Project will be designed to comply with this Standard. To comply with City stormwater requirements, the post-development discharge rate for the 25-year design storm will be mitigated to meet the 2-year pre-development design storm discharge rate. The implementation of potential rainwater harvesting tanks, infiltration systems, and green roofs will help achieve these numbers for the proposed Project.

Standard #3: *Loss of annual recharge to groundwater should be minimized through the use of infiltration measures to the maximum extent practicable. The annual recharge from the post development site should approximate the annual recharge from the pre-development or existing site conditions, based on soil types.*

Compliance: The proposed Project will explore the use of recharge to the maximum extent feasible. The loss of annual recharge to groundwater by new developments will be limited, as the proposed Projects will be located on parcels which are significantly impervious in the existing condition. To compensate for any possible annual recharge loss, and to meet City stormwater requirements, recharge to groundwater will be a major component of the stormwater mitigation strategy.

Standard #4: *For new development, stormwater management systems must be designed to remove 80% of the average annual load (post-development conditions) of Total Suspended Solids (TSS). It is presumed that this standard is met when: Suitable nonstructural practices for source control and pollution prevention are implemented; Stormwater management best management practices (BMPs) are sized to capture the prescribed runoff volume; and Stormwater management BMPs are maintained as designed.*

Compliance: The proposed designs will include BMPs intended to remove TSS. Within the proposed Project's limit of work, there will be predominantly roof areas. The Proponent intends to direct runoff from any paved areas within each Project Component site that would contribute unwanted sediments or pollutants to the existing storm drain system to either deep sump, hooded catch basins before discharging into the City's stormwater system or a subsurface infiltration system. The Proponent is also exploring stormwater management systems, such as subsurface infiltration systems, rainwater harvesting and proprietary mechanical units, that have the potential to remove 80 percent of TSS.

Standard #5: *For land uses with higher potential pollutant loads, source control and pollution prevention shall be implemented in accordance with the Massachusetts Stormwater Handbook to eliminate or reduce the discharge of stormwater runoff from such land uses to the maximum extent practicable. If, through source control and/or pollution prevention, all land uses with higher potential pollutant loads cannot be completely protected from exposure to rain, snow, snow melt, and stormwater runoff, the proponent shall use the specific structural stormwater BMPs determined by the Department to be suitable for such uses as provided in the Massachusetts Stormwater Handbook. Stormwater discharges from land uses with higher potential pollutant loads shall also comply with the requirements of the Massachusetts Clean Waters Act, M.G.L.c. 21, §§ 26-53 and the regulations promulgated there under at 314 CMR 3.00, 314 CMR 4.00 and 314 CMR 5.00.*

Compliance: The vast majority of each Project Component site will be occupied by buildings not associated with land uses with higher potential pollutant loads. The Projects are expected to produce similar pollutant loads to the existing conditions, which will be mitigated as the Project removes 80 percent of TSS.

Standard #6: *Stormwater discharge to critical areas must utilize certain stormwater management BMPs approved for critical areas. Critical areas are Outstanding Resource Waters (ORWs), shellfish beds, swimming beaches, cold-water fisheries and recharge areas for public water supplies.*

Compliance: The proposed Project does not discharge to a critical area.

Standard #7: *A redevelopment project is required to meet the following Stormwater Management Standards only to the maximum extent practicable: Standard 2, Standard 3, and the pretreatment and structural stormwater best management practice requirements of Standards 4, 5, and 6. Existing stormwater discharges shall comply with Standard 1 only to the maximum extent practicable. A redevelopment project shall also comply with all other requirements of the Stormwater Management Standards and improve existing conditions.*

Compliance: The Project is considered a redevelopment project. The proposed Project will comply with the Stormwater Management Standards to the extent practicable and is anticipated to improve upon existing conditions.

Standard #8: *Erosion and sediment controls must be implemented to prevent impacts during construction or land disturbance activities.*

Compliance: Sedimentation and erosion controls will be incorporated as part of the design of the Project components and employed during the various phases of construction. Erosion and sediment control plans will be submitted to the DPW as each Project Component moves forward and the contractor will be required to implement the measures.

Standard 9: *A Long-Term Operation and Maintenance (O&M) Plan shall be developed and implemented to ensure that stormwater management systems function as designed.*

Compliance: An O&M Plan will be developed during the design processes of each Project Component.

Standard 10: *All illicit discharges to the stormwater management system are prohibited.*

Compliance: There are no currently known illicit discharges. All proposed discharges will be reviewed by the DPW to ensure consistency with this standard.

Compliance with City of Cambridge Stormwater Management Regulations

In addition to complying with the relevant DEP stormwater policies, the Project will meet the requirements set forth by the City. As previously mentioned, the Project will be required to mitigate stormwater effluent from the post-development 25-year design storm to the rates of the pre-development 2-year design storm, as well as reduce TSS by 80 percent from the pre-development condition. While the Proponent intends to meet these base requirements, it will also seek to replace some of the on-site stormwater mitigation strategies through supporting efforts by the City to increase stormwater capacity in the overall Kendall Square area. In discussions with the DPW

on March 13, 2015, the Proponent was informed of two planned ventures to refurbish and expand two large stormwater storage tanks near the KSURP area. As the design of each Project Component progresses, the Proponent will coordinate with the City to determine if support can be given to neighborhood-scale stormwater projects in lieu of some on-site stormwater mitigation infrastructure.

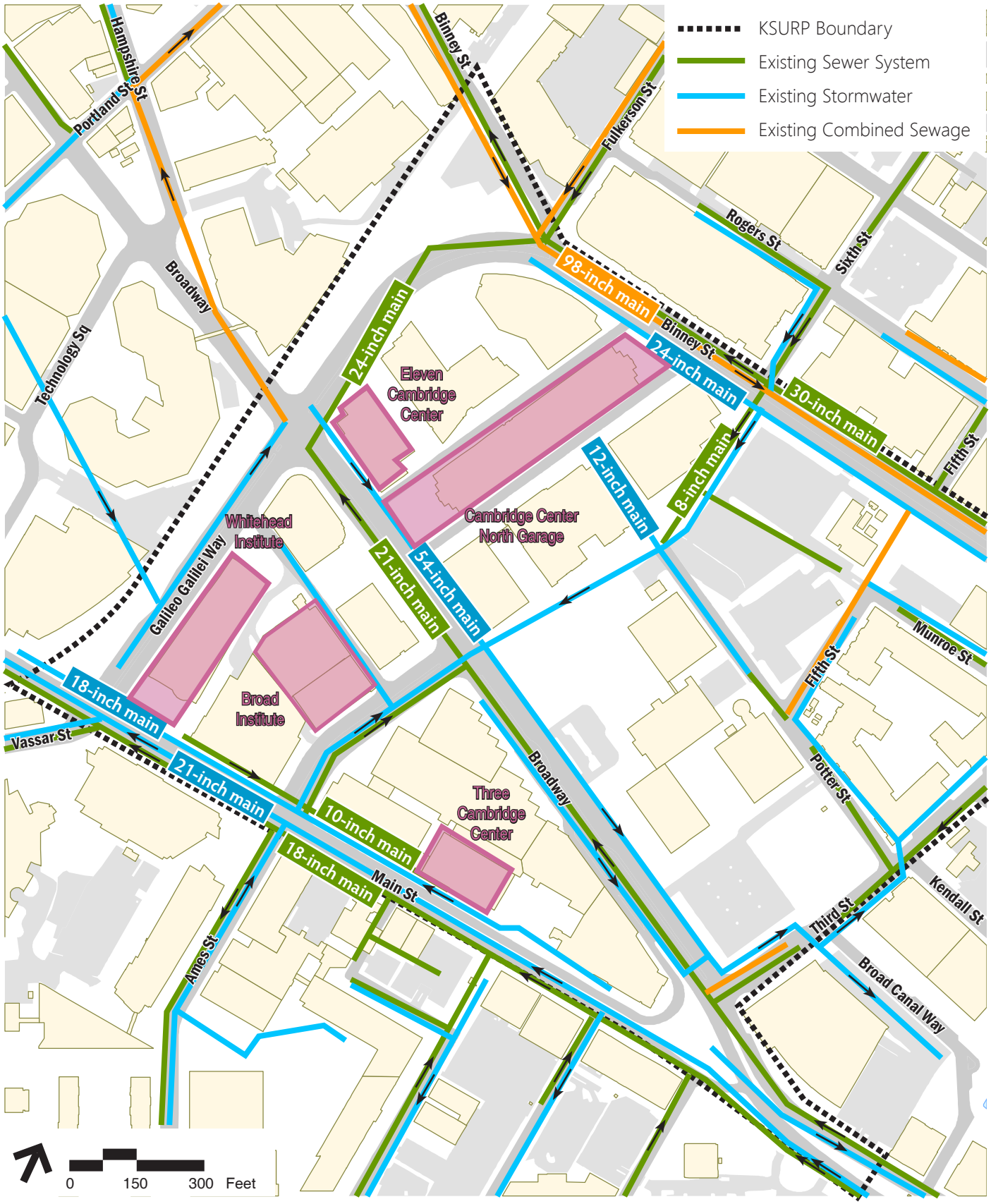

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Figure 5.1
Existing Drainage & Sewer Systems

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge CityViewer

6

Water and Wastewater

Introduction

The following chapter presents the anticipated water demand and wastewater generation for the Project and evaluates changes to impacts associated with the Project Change compared to the Prior Project. As part of the initial implementation of the KSURP, utility systems were rebuilt in the KSURP area in the 1960's and 1980's. Furthermore, the DPW and Cambridge Water Department (CWD) have invested in several projects in recent years to improve capacity issues in the Kendall Square neighborhood. The Project will further infill the heavily developed area and, therefore, will benefit from these infrastructure improvements and seek to aid the City in improving the local services.

Summary of Project Change Impacts

As described in Chapter 1, *Project Change Description*, the Project consists of the redevelopment of three existing buildings within the KSURP area as well as an office expansion at the Whitehead building and conversion of mechanical space to office space at the Broad Institute. Overall, the Project will result in the creation of approximately 1,034,000 square feet of net new commercial office/lab/innovation space, residential units, and retail space. These additional uses will generate new potable water demands and wastewater effluent in the KSURP area compared to the Prior Project. The DPW owns and operates the wastewater collection systems within the KSURP area, while the CWD locally operates the water distribution systems. The Project will require DPW and CWD review and approval of all plans relating to utility work as each Project Component moves forward in design. All water and wastewater infrastructure will be in accordance with MassDEP requirements as well.

Regulatory Context

The Project design will be consistent with the requirements of both the DPW and CWD, as well as, MassDEP Title V requirements. The City has its own requirements for new construction connecting to its water and wastewater systems which is reviewed for compliance by their agencies. The most significant requirement for large construction projects in Cambridge is the ability to hold 24 hours of wastewater flow on-site. This is completed using sanitary holding tanks with electronic sensors to detect when the sewer service is in danger of backing up into the building. An actuated valve in the sanitary holding tank then closes, and wastewater is held up to 24 hours, until the sensor detects wastewater levels in the main have fallen. This is a result of significant combined sewer capacity issues that Cambridge experiences during large precipitation events.

The City also requires all new developments mitigate their contributions at a ratio of 4:1 to stormwater infiltration and inflow (I/I) in their neighborhood sanitary sewers. As such, the Proponent will need to negotiate with the City to determine the best way to reduce the amount of I/I equivalent to four (4) times the Project wastewater generation. Generally, the Proponent either makes a payment to the City to implement I/I reduction measures, prorated to what the Proponent is responsible for, or incorporates reduction measures as a part of the Project. These reduction measures include separating stormwater infrastructure from sanitary infrastructure or replacing damaged and/or leaking sanitary sewers adjacent to each Project Component site, as needed.

MassDEP Title V, 310 CMR 15.000, is a state environmental code meant generally for the installation of septic tanks, but includes some requirements of general sewer system installations, as well as being the standard for wastewater sewer generation rates in the Commonwealth of Massachusetts. Specifically, sections 310 CMR 15.221: General Construction Requirements for All System Components and 310 CMR 15.222: Building Sewers are applicable to the Project. Other sections of Title V may become relevant if alternative wastewater components are incorporated into the individual designs of each Project Component, such as a greywater reuse system. The Project as a whole will be in compliance with all applicable Title V requirements, which will be explored further upon the design of each Project Component.

Wastewater

Existing Wastewater Infrastructure

There are several City sanitary sewer mains in the KSURP area, as shown in Figure 5.1. Wastewater flows from the Project will travel northeasterly by gravity flow to the MWRA system located in Cardinal Medeiros Avenue. Individual service connections

to the Cambridge wastewater infrastructure will be designed as each Project Component progresses in its design. No capacity issues in the gravity mains are known at this time, but the ability of the municipal system to take on additional wastewater from these projects will be confirmed through coordination of each Project Component with the DPW. The Proponent will coordinate with the DPW on the design for proposed connections to their sewer systems.

The following is a list of sewer services adjacent to each Project Component (Figure 5.1):

Cambridge Center North Garage

- A 30-inch main in Binney Street
- A 98-inch combined sewer main in Binney Street
- A 8-inch main in the pedestrian walk
- A 21-inch main in Broadway

Eleven Cambridge Center

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

Three Cambridge Center

- A 18-inch main in Main Street
- A 10-inch main in Main Street

Estimated Wastewater Generation

The Project's proposed approximately 1,034,000 square feet of net new uses will generate additional wastewater flows. Table 6-1 below presents the summary of wastewater generation by Project Component and use for both the existing and proposed condition. Overall, the Project is projected to generate an estimated 107,945 gallons per day (gpd) of new wastewater flows. Each Project Component is required by the DPW to have sanitary holding capacity on-site equivalent to 24 hours of sanitary flows, which for the Project in its entirety will require 107,945 gallons of storage. MassDEP no longer requires Self-certifications, as they have an agreement with the City for project reviews concerning wastewater. The Proponent will coordinate all sewer connections to City infrastructure with the City as required by the DPW as designs progress.

Table 6-1 Estimated Wastewater Generation

Building	Use	Quantity	Flow Rate (gpd)	Sewage Generation (gpd)
New Project-Related Sewage Generation				
Three Cambridge Center	Commercial	106,200	75/1,000 sf	7,965
	Residential	266	110/bdrm	29,260
	Retail	20,000	50/1,000 sf	1,000
Three Cambridge Center Total				*38,225*
Eleven Cambridge Center	Residential	294	110/bdrm	32,340
	Retail	25,000	50/1,000 sf	1,250
Eleven Cambridge Center Total				*33,590*
Cambridge Center North Garage	Commercial	546,000	75/bdrm	40,950
	Retail	5,000	50/1,000 sf	250
	Innovation	39,000	75/1,000 sf	2,925
Cambridge Center North Garage Total				*44,125*
Whitehead Institute	Commercial	60,000	75/1,000 sf	4,500
Whitehead Institute Total				*4,500*
Broad Institute	Commercial	15,100	75/1,000 sf	1,133
Broad Institute Total				*1,133*
Total New Project-Related Sewage Generation				**121,573**
Existing Sewage Generation to be Removed				
Three Cambridge Center	Commercial	105,100	(75/1,000sf)	(7,883)
Eleven Cambridge Center	Commercial	76,600	(75/1,000sf)	(5,745)
Total Existing to be Removed				**(13,628)**
Net New Wastewater Generation				**107,945**

gpd gallons per day

Proposed Wastewater Mitigation

As the project design progresses, the Proponent will coordinate with the DPW to determine the most effective strategy to improve local wastewater infrastructure. In a meeting on March 13, 2015, the DPW indicated that they have a number of projects planned to increase both stormwater and wastewater capacity in the KSURP area.

Inflow/Infiltration Mitigation

As previously mentioned, the Proponent will be required to remove stormwater I/I to the sanitary infrastructure equivalent to the volume of four (4) times the Project-related estimated wastewater generation. At this stage of the design, it is anticipated that the Project will be required to remove 431,780 gpd of stormwater from the sewer system. This I/I reduction will be accomplished by coordinating with the City to either correct I/I issues within the KSURP area or pay for projects the City is performing in an effort to reduce I/I. The Proponent will coordinate with the City to determine the most effective strategy for mitigating I/I while exploring the possibility to make additional improvements in lieu of holding the required 24 hours of sanitary flow on-site during a surcharge condition.

While the Project will commit to holding the required 24 hours of wastewater volume on-site, the Proponent will negotiate with the City to determine if focusing efforts on improving system infrastructure is a more effective improvement strategy. Therefore, the Project may accept responsibility for performing sanitary infrastructure improvements in excess of the required I/I mitigation in place of on-site sanitary storage tanks.

Wastewater Reduction Measures

The Project will attempt to reduce wastewater reduction as much as practicable. Title V wastewater generation rates are generally considered conservative for determining sewage generation rates and, therefore, actual generation is expected to be less for each Project Component than what is presented herein. The Project will apply water conservation measures, as described in the 'Domestic Water' section below, which consequently leads to reduced wastewater generation. The inclusion of low-flow plumbing fixtures, efficient air conditioning systems, and possible use of greywater or rainwater harvesting systems will all contribute to reducing sewage generation.

Domestic Water

Existing Domestic Water System

The existing water system servicing the KSURP area is shown on Figure 6.1. Domestic water and fire protection services will be supplied by local water mains in central Cambridge to each of the Project Components. The water system is maintained by the CWD, who reviews the design of all connections to their services. Systems will be made as redundant as possible. Although there are some large 30-inch transmission lines in the KSURP area, each Project Component will focus on connecting to 12-inch and 16-inch water mains. The CWD indicated via phone conversation on March 25, 2015 that there should not be a capacity issue in the KSURP area given the size of

existing mains. The CWD did indicate that water pressure in the KSURP area is around 60 psi, indicating that both water and fire protection services for this Project would require booster pumps to provide sufficient pressure to the proposed buildings. The CWD specifically mentioned that access will need to be maintained to a line that runs under the Cambridge Center North Garage servicing a private hydrant, and that public water lines and service laterals will not generally be allowed to be under buildings or structural slabs for maintenance reasons.

The Proponent will meet with the CWD in the early stages of design for each Project Component to determine where capacity and pressure may become an issue and evaluate adjacent infrastructure to determine the most effective means of providing water service.

The following is a list of water services adjacent to each Project Component (Figure 6.1):

Cambridge Center North Garage

- A 16-inch main in Binney Street
- A 12-inch main in Binney Street
- A 30-inch main in Broadway
- A 16-inch main in Broadway

Eleven Cambridge Center

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

Three Cambridge Center

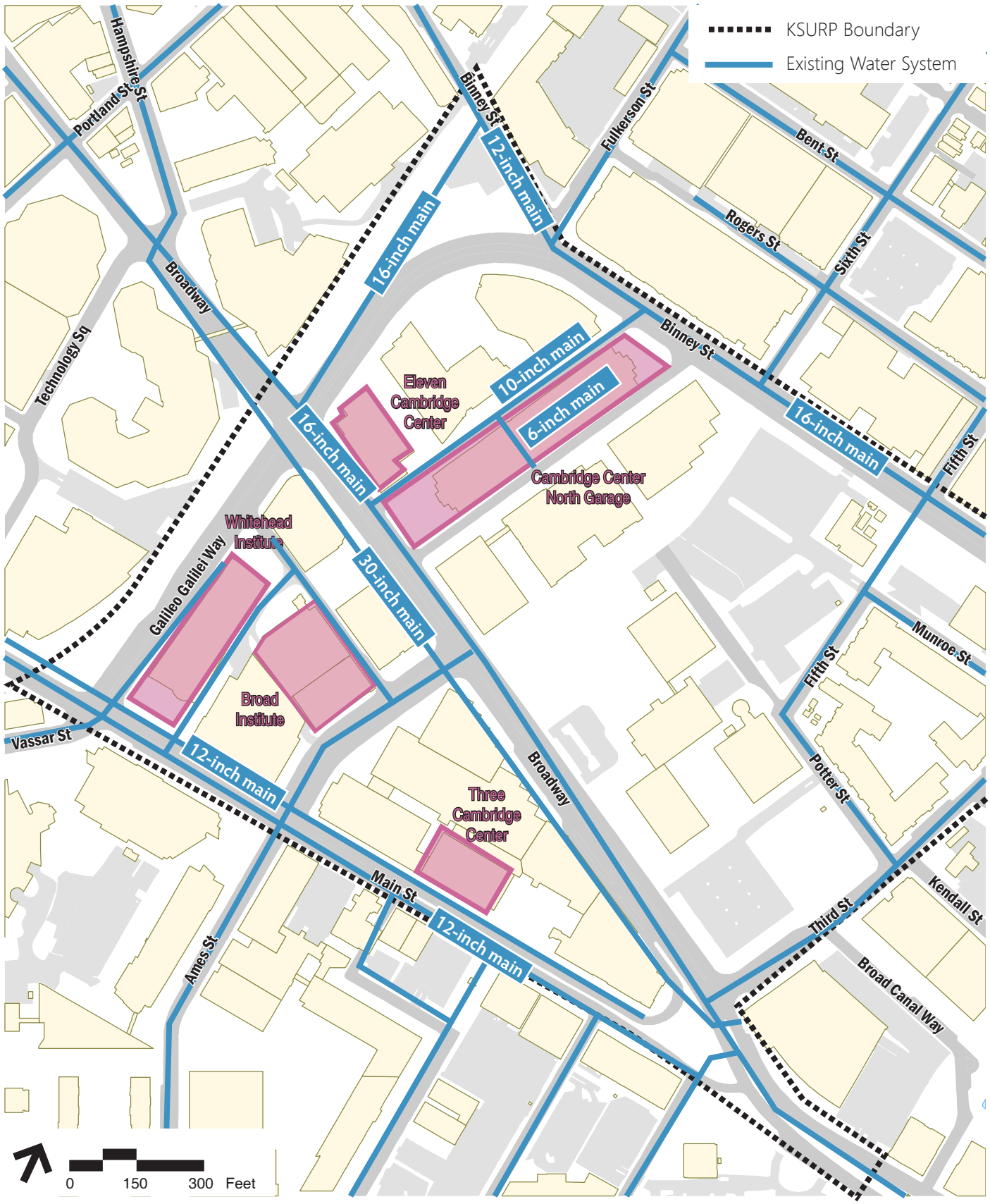
- Two 12-inch mains in Main Street

Estimated Domestic Water Demand

Domestic water demand is based on estimate sewage generation with an added factor of 10 percent for consumption, system losses, and other use. Based upon sewage generation rates outlined in MassDEP Sewer Connection and Extension Regulations, 310 CMR 15.203.f, the Project will require approximately 118,740 gpd of net new potable water demand.

Water Conservation Measures

The Project will attempt to conserve water through several methods, including low-flow plumbing fixtures, efficient air conditioning systems, and efficient landscape irrigation practices, such as using native vegetation. The Proponent will also explore the viability of alternate water sources such as water reuse systems or rainwater harvesting, as well as the practicality of xeriscaping, which is landscaping that does not require irrigation.



CRA

Figure 6.1
Existing Water System

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

Source: City of Cambridge CityViewer

7

Hazardous Materials

Introduction

This chapter describes the existing hazardous materials conditions for each Project Component. The Cambridge Center properties subject to this NPC are located on three separate parcels (Parcels 2, 3 and 4), as used historically to describe hazardous materials conditions. The historic and existing site conditions of these parcels as well as the potential measures proposed to handle or mitigate conditions are described herein.

Summary of Project Change Impacts

The MXD Zoning District of the KSURP area was identified as having the potential for another approximately one million square feet of development (commercial, retail and residential) by infilling sites. As described in Chapter 1, *Project Change Description* of this NPC, new commercial space would envelope and rise above the existing Cambridge Center North Garage (Figure 1.1). Additionally, a new high-rise residential building would occupy the lot that currently is occupied by a low-rise office building at Eleven Cambridge Center (Figure 1.3). As part of a later phase, a residential and commercial building with retail is proposed at Three Cambridge Center following demolition of the existing building (Figure 1.5). The new development also includes new parking both above and below-grade.

From a hazardous materials perspective, there are no key changes to report as the Project Change consists of potential new development associated with rezoning the KSURP area. As each Project Component moves forward, it will be required to adhere to applicable hazardous materials regulations.

Regulatory Context

The first environmental regulations in Massachusetts related to evaluating properties for the presence of oil and hazardous materials were enacted in 1983. Rules and regulations regarding assessment and remediation of contaminated sites known as the Massachusetts Contingency Plan (MCP) was first adopted in 1988. Since 1988 and development of the subject properties the regulations have been rewritten and updated numerous times. The most recent and significant regulation rewrite occurred in June 2014.

The properties subject to Plan Amendment No. 10 have either achieved regulatory closure under the MCP or were developed prior to the adoption of MCP (1988), as summarized below.

North Garage and Eleven Cambridge Center

Response actions were conducted under Phase IV of the 1988 MCP as finalized in the Final Inspection Report submitted to MassDEP in 1990 under (RTN 3-00758). A long-term groundwater monitoring program was conducted from 1990 to 1994 to monitor groundwater quality in the remediated area. Low levels of petroleum and VOCs were detected throughout the monitoring period. The Project Component site is currently pending no further action.

No documented releases have occurred at Eleven Cambridge Center. The property was developed before the MCP regulations in 1988.

Three Cambridge Center

No documented releases have occurred at Three Cambridge Center (and the adjacent plaza area) as the property was developed before the MCP regulations in 1988; however, based on a recent assessment of the plaza area between the existing buildings at Three, Four, and Five Cambridge Center detected contaminated soil that was managed under RTN 3-31047. The Project Compontn site achieved a Permanent Solution, Class A-2 Response Action Outcome (RAO) in August 2013.

Historical and Existing Site Conditions

As described in the *Notice of Project Change Form Narrative/Project Summary* section of this NPC, Cambridge Center emerged from approximately 24 acres of vacant land parcels previously occupied by low-rise manufacturing and industrial buildings, which were demolished beginning in 1968 as part of the approved KSURP. Cambridge Center had a number of industrial usages dating back to the late 1800's

that have impacted subsurface environmental conditions. Available information indicates that the KSURP area was occupied by wetlands and marshland surrounding Leachmere's Point until the early 1800's. Originally, the general KSURP area was developed in 1805 as a port of delivery connected to the Charles River tidal basin. By 1850, the KSURP area had been filled. A network of canals, canal-oriented streets and building lots were subsequently established.

The *Notice of Project Change Form Narrative/Project Summary* section provides general descriptions of existing site conditions for each Project Component site. These sites are located in an urban environment, characterized by flat-lying topography dipping slightly to the south. The depth to groundwater ranges from 8 to 12 feet below existing ground surface. Groundwater flow direction is anticipated to be towards the southeast. Subsurface soil conditions consist of a surficial layer of miscellaneous fill (urban fill) overlying former marsh and marine deposits consisting of organic soil and peat, marine sand and marine clay. Glacial outwash and till soil strata are present below the marine clay at depths greater than 50 feet from ground surface.

KSURP Parcel 2

KSURP Parcel 2 now occupied by the Cambridge Center North Garage and Eleven Cambridge Center (Figure S.6a) was occupied by a variety of industrial facilities, including an oil storage terminal, piano manufacturing, bus and truck body works, paint manufacturers, a plumbing supplies company, a liquid carbonic company, and a rubber stamp company. The Broad Canal was constructed through the southern portion of the parcel in the early 1800's running parallel to Broadway, as shown on Figure 7.1. Figures 7.2a-c present the historical maps of KSURP Parcel 2. By 1969 the former industrial buildings had been demolished and the canal filled. This parcel remained vacant until site development began in the early 1980's. The parcel is now completely occupied by low to high rise commercial and biotech lab buildings and a parking garage constructed from 1983 to 2013. No vacant lots remain within this parcel.

The Cambridge Center North Garage was constructed in 1990 is a 6-story precast concrete garage founded on end-bearing piles driven to glacial soils approximately 50 to 70 feet below-grade. No below-grade space exists below the garage.

The existing office/research building at Eleven Cambridge Center to be demolished as part of the Project is a 4-story building founded on spread footing foundations following excavation of the fill and organic soils and backfilling to footing level with compacted structural fill. During construction and surrounding site improvements in 1983/1984 a majority of the historic fill was excavated and stockpiled. Visibly contaminated soil was not observed during excavation. Some stockpiled fill material was reused for backfill and clean fill was imported to the site to raise the footing grades. The remainder of the stockpiled fill soils were removed from the site. Although no chemical testing of soil or groundwater has been conducted at this

property the potential for significant contamination to be present in soil is low. Testing of groundwater at the adjacent and upgradient property at Fifteen Cambridge Center indicates that groundwater has been impacted by VOCs (carbon tetrachloride and chloroform) contamination RTN 3-19217. Although Fifteen Cambridge Center is updradient from Eleven Cambridge Center, it was historically separated from the subject property by the former Broad Canal. However, it is possible that groundwater at the subject property could be impacted from historical site usage or more recent use as research and development.

KSURP Parcel 3

KSURP Parcel 3 now occupied by Whitehead Institute located north of Main Street (Figure S.6c) was occupied by UBS Chemical Corporation, which manufactured adhesives. Other historic uses of the parcel included an auto salvage and scrap yard, typesetters, a printed circuits company, an electrotype research building, a Gulf gasoline station (Main Street), a machine and tool company, an auto parts manufacturing company, residential houses, a diner, and the former South Canal. Whitehead Institute was the first building to occupy this parcel in 1983-84. KSURP Parcel 3 is currently occupied by the Marriott Residence Inn at Six Cambridge Center, a parking garage, The Broad Institute at Seven Cambridge Center and a commercial office building at Eight Cambridge Center all constructed during the late 1980 to 2005. The most recent construction to occupy this parcel was completed as an addition to the Broad Institute at 75 Ames Street in 2012/2013.

KSURP Parcel 4

KRURP Parcel 4 now occupied by Three Cambridge Center located east of Ames Street and north of Main Street (Figure S.6b). Historical maps, as shown on Figures 7.3a-c, indicate that the Three Cambridge Center area was occupied by residential dwellings and additional buildings shown as stores and flats. The 1934 and 1950 plans indicate that the dwellings were demolished and replaced by a bus yard and subway exit while the buildings shown as stores and flats remained. Other historical uses in this parcel included an electroplating facility, MBTA power traction station and auto repair and filling stations. Three Cambridge Center and the adjoining plaza were constructed in 1986. A parking garage with loading dock is located beneath the plaza area. This parcel is currently occupied by high rise commercial buildings known as One, Three, Four and Five Cambridge Center were constructed during the period 1980 to 1990. The most recent construction on this parcel included a connector between Three, Four, and Five Cambridge Center, and a renovated plaza area completed in 2013.

Three Cambridge Center is a four-story commercial and retail building constructed in 1987. Site development included excavation of fill materials to naturally deposited soils to construct a single basement level and spread footing foundations. Historic fill

was completely below the building to construct the below-grade space. Historic fill has also been removed below and around the adjoining properties to the north and east, including the plaza area and reconstruction of the MBTA station. Historic fill remains in the area below the Five Cambridge Center tract to the west. Recent soil testing conducted in the unexcavated portions of the area around Three, Four and Five Cambridge Center for recent plaza improvements detected levels of VOCs, metals, and PAH that required management as contaminated soil. While groundwater contamination has not been encountered historically, low levels of VOCs are anticipated to be present.

Status of On-Site Releases

A summary table of the Release Tracking Numbers (RTNs) for the Cambridge Center parcels is provided in Table 7-1 below. The on-site releases subject to the proposed KSURP Amendment No. 10 are summarized below. No documented releases have occurred at Eleven Cambridge Center.

RTN 3-00758 (290 to 300 Binney Street - North Garage)

Remediation was conducted in 1989 in compliance with the MassDEP-approved Remedial Response Implementation Plan (RRIP). Oil contaminated soil and underground storage tanks were remediated prior to construction at site. Remediation included excavation, stockpiling, and on-site treatment and subsequent removal of oil contaminated soils by asphalt batching, along with removal of USTs conducted during construction of the above-grade parking garage in 1990. Long-term groundwater monitoring program, conducted as part of RRIP from 1991 to 1994 indicate the presence low levels of VOCs and total petroleum hydrocarbons (TPH). A No Further Action determination was achieved in 1993.

RTN 3-31047 (Three, Four, and Five Cambridge Center Connector)

Site assessment activities conducted in support of site development identified compounds in soil at concentrations exceeding MCP Reportable Concentrations, including VOCs (cis-1,2-DCE, TCE, and PCE), PAHs, cadmium, and lead, attributed to historical site filling and usage. RAM activities were conducted to manage Remediation Waste associated with below-grade foundation construction of two new building connectors and new utilities. The site achieved a Class A-2 Response Action Outcome (RAO) in 2013.

Future Conditions/Project Impacts and Proposed Mitigation

Compliance with Massachusetts Contingency Plan (MCP)

The Project will require characterization of the soil and groundwater conditions for management of contaminated soil during construction and to evaluate the residential use exposure scenario. It is assumed that testing of soil and groundwater at the North Garage and Eleven Cambridge Center will result in a new reporting condition to MassDEP and that activities at the properties would be subject to the requirements of the MCP, 310 CMR 40.0000. It is anticipated that conditions in the area outside Three Cambridge Center will encounter similar contaminant levels in soil as those encountered during the recent plaza improvement and connector work at Three, Four, and Five Cambridge Center and, therefore, it is likely that new activities can proceed under the existing RTN; however, testing of groundwater may result in a new reporting condition.

Management of contaminated soil and groundwater and implementation of measures to reduce the risk of exposure to contaminants at these properties will be conducted under a Release Abatement Measure (RAM) Plan. It is anticipated that the measures undertaken under the RAM will result in achieving a Permanent Solution for each property redevelopment.

Given the construction period of the buildings (1982 to 1990) the presence of asbestos containing material (ACM) is not anticipated. If ACM is encountered during demolition it will be handled appropriately in accordance with state and local regulations.

A summary of the anticipated assessment and remedial activities for each property is summarized below.

North Garage Commercial Component (Parcel 2)

As previously mentioned, no below-grade space exists under the garage. Construction of below-grade space will require removal of the existing historic fill and organic soils that remain. New foundations will be required to support loads imposed by the planned additional levels of above-grade parking. It is anticipated that a majority of the historic fill and underlying soils will be significantly impacted with petroleum oils and hazardous materials and, therefore, characterization of soil materials in-place prior to excavation is planned as part of the Project. It is anticipated that contaminated groundwater will also be encountered and that treatment of construction dewatering effluent will be required. It may also be necessary to install a

vapor mitigation system to eliminate the vapor intrusion pathway based on the outcome of the groundwater data.

Table 7-1 Summary of RTNs at Cambridge Center

Name/Address	RTN	Description of Release	Regulatory Status
Main Street (MIT Whitehead Institute, 9 Cambridge Center)	3-00273	Volatile organic compounds (VOCs) were encountered in test pit excavations conducted in 1983 in preparation of building construction. Additional investigations determined that metals and VOCs are present in soil and groundwater at the site. The contamination was due to spills and releases from former underground storage tanks at the site. Polymers and adhesives were manufactured at the site in 1971 releasing chemicals associated with these processes in fill, natural soil, and groundwater. A risk assessment conducted by Environmental Research & Technology, Inc. in 1983 assigned a low risk of potential environmental/human health impairment from conditions at this site; however, the report cautioned that uncontrolled exposure or release of chemicals could occur during excavation of soil.	DEPNFA (No further action required) 1993
99 -109 Broadway (10 Cambridge Center)	3-00747	Historical use of this property included soap manufacturer, building wrecker's yard and storage, metals storage, rubber goods manufacturer, carpenter, saw mill, piano/organ factory, lumber company, auto garage, and electrical fixtures. A 1987 Environmental Site Assessment (ESA) conducted at the site just prior to construction of the current building indicated that contaminants are present in soil including oil and grease, total metals arsenic, barium, cadmium, lead and mercury, and trace level toluene. Contaminants including oil and grease, Ploycyclic Aromatic Hydrocarbons (PAHs), Volatile Organic Compounds (VOCs) benzene, vinyl chloride, and trans-1,2 dichloroethene are present in groundwater. The risk assessment concluded negligible risk of cancer or pollutant-related health risks associated with development and use of site. A letter from MassDEP to the Cambridge Redevelopment Authority dated 21 July 1988 indicated that MassDEP concluded that the site is a "disposal site for which no further action is necessary."	PENNFA (pending no further action) 1988
12 Cambridge Center (Potter Parcel)	3-01988 3-25774	The site formerly known as the Potter Parcel on Parcel 2 of the Kendall Square Urban Renewal Area was occupied with an oil storage facility from 1886 to 1966. Environmental evaluation conducted in the 1987 and 1993 concluded that soil and groundwater at the site are contaminated with petroleum constituents consistent with former site usage. The source of contamination appears to be a tank farm that was formerly located on the property. The site was listed as location to be investigated in 1989 and was given RTN 3-1988 in 1993. RTN 3-25774 was assigned to address groundwater contamination following development of the site in 2006. In 2009 a Phase V Status Report to maintain a Remedy Operation Status monitoring this disposal site. A Remedy Implementation Plan was conducted in 2006 concurrently with the construction of Building 6A (office, lab, steam/power co-generation) and included removal and off-site disposal of petroleum source-area impacted soils and groundwater dewatering, treatment, and discharge. Quarterly groundwater sampling indicates declining trend in concentrations of petroleum related compounds (EPH, VPH, PAHs, and petroleum related VOCs).	RTN 3-01988 related to soil contamination achieved regulatory closure with a Class A-3 RAO and Activity Use Limit (AUL) in 2009 Remedial activities associated with underslab drainage effluent below Biogen Bldg 6A is currently on-going as MCP Phase V under RTN 3-25774

Table 7-1 Summary of RTNs at Cambridge Center (Continued)

Name/Address	RTN	Description of Release	Regulatory Status
262 Binney Street (14 Cambridge Center)	3-03274	This site, located at the northeast side of the North Garage was developed in 1983 with the current building. Petroleum contamination was noted during construction in 1982-83. Fill was removed in the northern portion of the building and replaced with clean soil. A limited site investigation was conducted at the property in 1990. Soil testing detected kerosene contamination. NAPL was measured in one monitoring well. Haley & Aldrich concluded in a Consultant of Record Statement dated 31 July 1997 that conditions at the site do not represent potential exposures to the building occupants based on the results of a health risk assessment conducted in 1992 and concluded that no further remedial action was necessary. MassDEP concluded in a letter dated 22 September 1992 that the conditions do not appear to present an immediate threat to public health, safety or the environment.	PENNFA (pending no further action)
12 Cambridge Center (Potter Parcel)	3-25774	Continued monitoring of underslab drainage effluent is currently on-going under RTN 3-25774. Concentrations of 1,2-dichloroethane, the primary contaminant, have been non-detect since 2012.	MCP Phase V REMOPS (2012)
346 Binney Street (15 Cambridge Center)	3-01987 3-15370	Site was originally listed as an MCP Disposal Site under RTN 3-1987. During an initial environment assessment on the Fulkerson Parcel, metals, semi-volatile organic compounds (SVOCs), and petroleum hydrocarbons were identified in soil and groundwater samples. A new RTN 3-15370 was issued in 1997. Remediation occurred concurrent with development. MCP Phase I and Tier Classification Report were written in 1998. RAM activities included management of contaminated soil and groundwater concurrently with the construction of the existing building in 1999-2001. A RAM completion report and Response Action Outcome (RAO) were submitted in 2002.	Class A-3 RAO with Activity Use Limit (AUL) 2002, AUL Amended in 2013.
346 Binney Street (15 Cambridge Center)	3-19217, *linked to 3-15370 (Primary RTN)*	January 2000 groundwater samples associated with dewatering activities during construction reported carbon tetrachloride and chloroform in concentration above MCP RCGW-2. Immediate Response Action (IRA) activities were undertaken.	linked to Primary RTN 3-15370 with Class A-3 RAO
346 Binney Street (15 Cambridge Center)	3-18804, *linked to 3-15370 (Primary RTN)*	Release from an abandoned UST was identified September 1999 during remedial actions for redevelopment of the site (RTN 1987). An Immediate Response Action (IRA) was implemented to mitigate release from UST. RTN was linked to the Class A-3 RAO Statement. The contents of the tank are unknown, though residual contents may be paint thinner. Tank capacity is ~3,000 gallons. IRA Completion Statement submitted February 2000.	linked to Primary RTN 3-15370 with Class A-3 RAO
290- 300 Binney (North Garage)	3-00758	Remediation completed in compliance with the MassDEP-approved Remedial Response Implementation Plan (RRIP) in 1989. Oil contaminated soil and underground storage tanks were remediated prior to construction at site. Remediation included excavation, stockpiling, and on-site treatment and subsequent removal of oil contaminated soils by asphalt batching, along with removal of USTs conducted during construction of the above-grade parking garage in 1990. Long-term groundwater monitoring program, conducted as part of RRIP from 1991 to 1994 indicate the presence low levels of VOCs and total petroleum hydrocarbons (TPH).	PENNFA (pending no further action) 1993

Table 7-1 Summary of RTNs at Cambridge Center (Continued)

Name/Address	RTN	Description of Release	Regulatory Status
3, 4 and 5 Cambridge Center Connectors	3- 31047	Site assessment activities conducted in support of site development identified compounds in soil at concentrations exceeding MCP Reportable Concentrations, including VOCs (cis-1,2-DCE, TCE, and PCE), PAHs, cadmium, and lead, attributed to historical site filling and usage. RAM activities were conducted to manage Remediation Waste associated with below-grade foundation construction of two new building connectors and new utilities.	Class A-2 RAO 2013
310-344 Binney (17 Cambridge Center)	3-01987 3-03437	RTN 3-01987 was originally assigned to the Fulkerson Parcel located within the Kendall Square Urban Renewal Parcel 2. The Fulkerson Parcel was divided into two parcels and assigned different RTNs (one for 310 to 344 Binney Street and one for the remainder of the Fulkerson Parcel which eventually transitioned to 15 Cambridge Center). RTN 3-03437 was assigned to 310 to 344 Binney Street in 1990 when an ESA identified metals, VOCs, SVOCs, PAHs, and petroleum hydrocarbons in soils samples, along with metals, petroleum hydrocarbons, and SVOCs in groundwater, likely due to numerous petroleum and solvent based USTs and ASTs. ESA concluded that development and use of the site posed no significant pollutant-related health risks and RTN 3-03437 achieved a No Further Action determination in 1997. Three USTs were uncovered in 2012 during pre-excavation activities for construction of the currently existing building, one of which was leaking and assigned RTN 3-30699. After UST removal disposal of impacted soil was addressed under the RAM Plan submitted under RTN 3-3437. A subslab vapor barrier and passive ventilation system was installed below the ground floor slab of the new building and the connector to 15 Cambridge Center. RAM activities related to monitoring of indoor air are on-going and RAM status reports are submitted every 6 months.	PENNFA (pending no further action) 1997 RAM activities on-going related to monitoring of indoor air
7 Cambridge Center	3-01989	This site is part of a larger site (Parcel 3) which is listed as a disposal site by MassDEP. Results of a 1989 Phase I Environmental Site Assessment detected petroleum hydrocarbons, heavy metals, volatile organic compounds and semi-volatile organic compounds in the soil and groundwater at the site. A Consultant-of-Record Statement under the 1993 Massachusetts Contingency Plan (MCP) was prepared for Parcel 3 and submitted to MassDEP on August 2, 1995. The Consultant-of-Record statement affirmed that based upon a review of existing information pertaining to the site, the conclusion contained in the 1989 assessments recommending "no further action" was valid and complied with the 1988 MCP. A RAM Plan was submitted in 2004 to manage contaminated soil associated with the construction of the current building at Seven Cambridge Center. A Class A2 RAO was achieved on 5 December 2005 following completion of RAM activities. Recent construction of the Broad Institute addition at 75 Ames Street was conducted as a Post-RAO response action.	Class A-2 RAO 2005
6 Cambridge Center	3-12210	This site is also part of a larger site under RTN 3-01989, Kendall Square Urban Renewal Parcel 3. RTN 3-12210 was assigned to a historic release from a gasoline discovered during demolition of the former gasoline station and removal of two 8000 gallon gasoline USTs. Response actions conducted as an Immediate Response Action (IRA) also included removal of contaminated soil and groundwater.	Class A-2 RAO 1996

Eleven Cambridge Center Residential Component (Parcel 2)

As previously mentioned, it is possible that groundwater at Eleven Cambridge Center could be impacted. Groundwater testing and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use. No basement exists below the ground floor of Eleven Cambridge Center. Construction of below-grade parking will require removal of the existing fill and the garage will act to eliminate the vapor intrusion pathway to residences. It is anticipated that a small volume of contaminated soil will be encountered during excavation and, therefore, characterization of soil materials in-place prior to excavation is planned as part of the Project. The initial phase of the characterization program would take place prior to building demolition at the exterior of the existing building. A second characterization phase would occur following building demolition and removal of the existing footing foundations. Groundwater testing and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use although the presence of below-grade parking will act to eliminate the vapor intrusion pathway to residences.

Three Cambridge Center Residential and Commercial Component (Parcel 4)

The presence of contaminated soil is not anticipated below the excavated portions of the property, however additional deeper excavation would require sampling and testing of soil prior to new construction. However, based on recent soil testing conducted in the unexcavated portions of the area around Three, Four, and Five Cambridge Center for recent plaza, it is anticipated that soil beneath the unexcavated portions of the plaza area around Three Cambridge Center will detect levels of VOCs, metals, and PAH that will require management as contaminated soil that can be managed as a Post-RAO construction activity. Additionally, while groundwater contamination has not been encountered historically, low levels of VOCs are anticipated to be present. Levels of contaminants that exceed the applicable Reportable Concentrations in groundwater will require new reporting under the MCP and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use under this new RTN.

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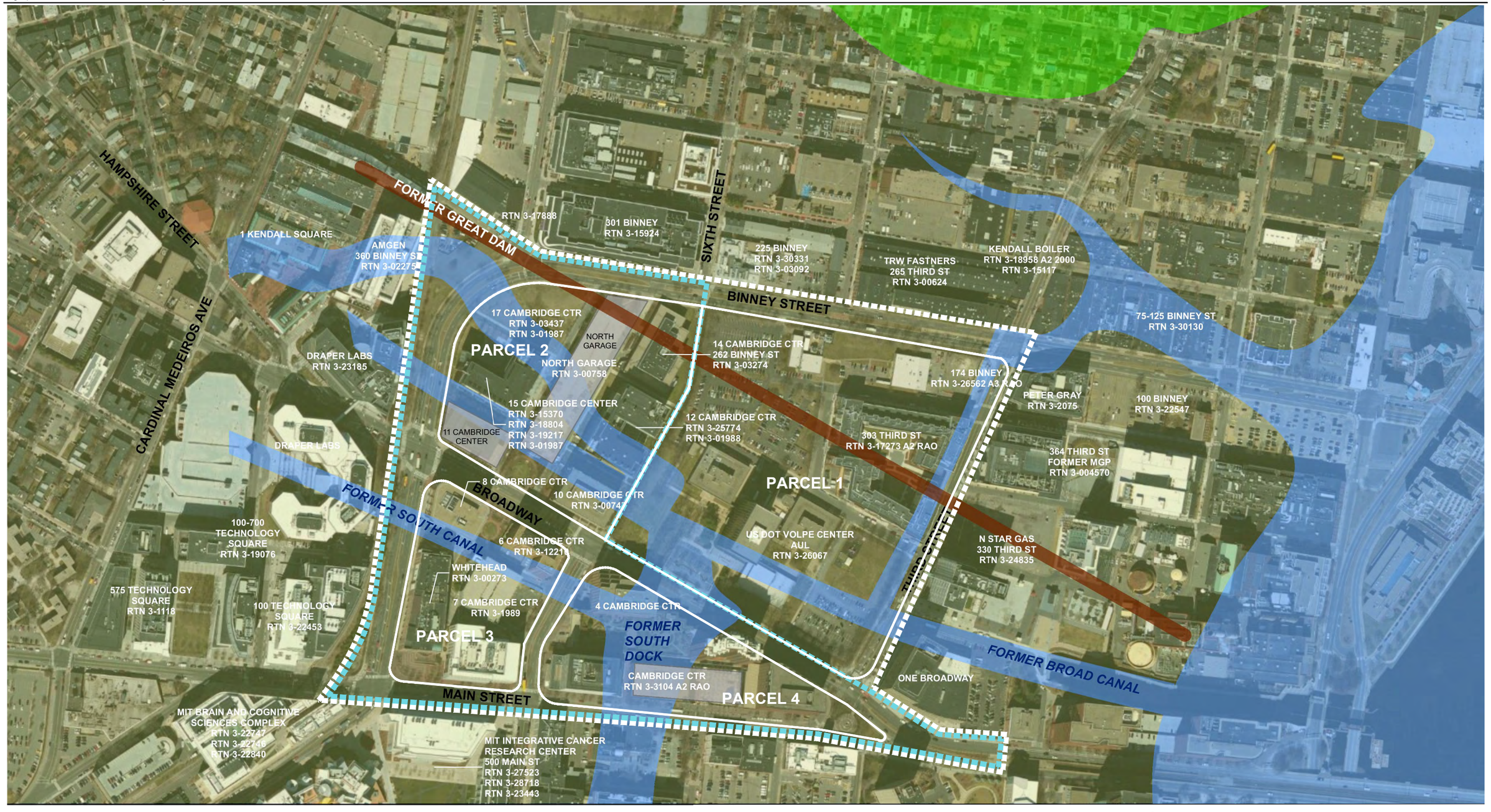


LEGEND

- FILLED TIDELANDS
- LAND
- FORMER WATER WAY
- KSRUP BOUNDARY
- MXD DISTRICT

NOTES

1. BASE MAP SOURCE: ESRI 2014.

2. 1777 LAND COVER INFORMATION APPROXIMATED FROM A FIGURE TITLED "CAMBRIDGE: VICINITY IN REVOLUTIONARY TIMES COMPILED TO SHOW THE PAROLE LIMITS OF BURGOYNE'S OFFICERS 1777" BY SAMUAL BATCHELDER 1925. RE-DIGITIZED BY HALEY & ALDRICH 2014.

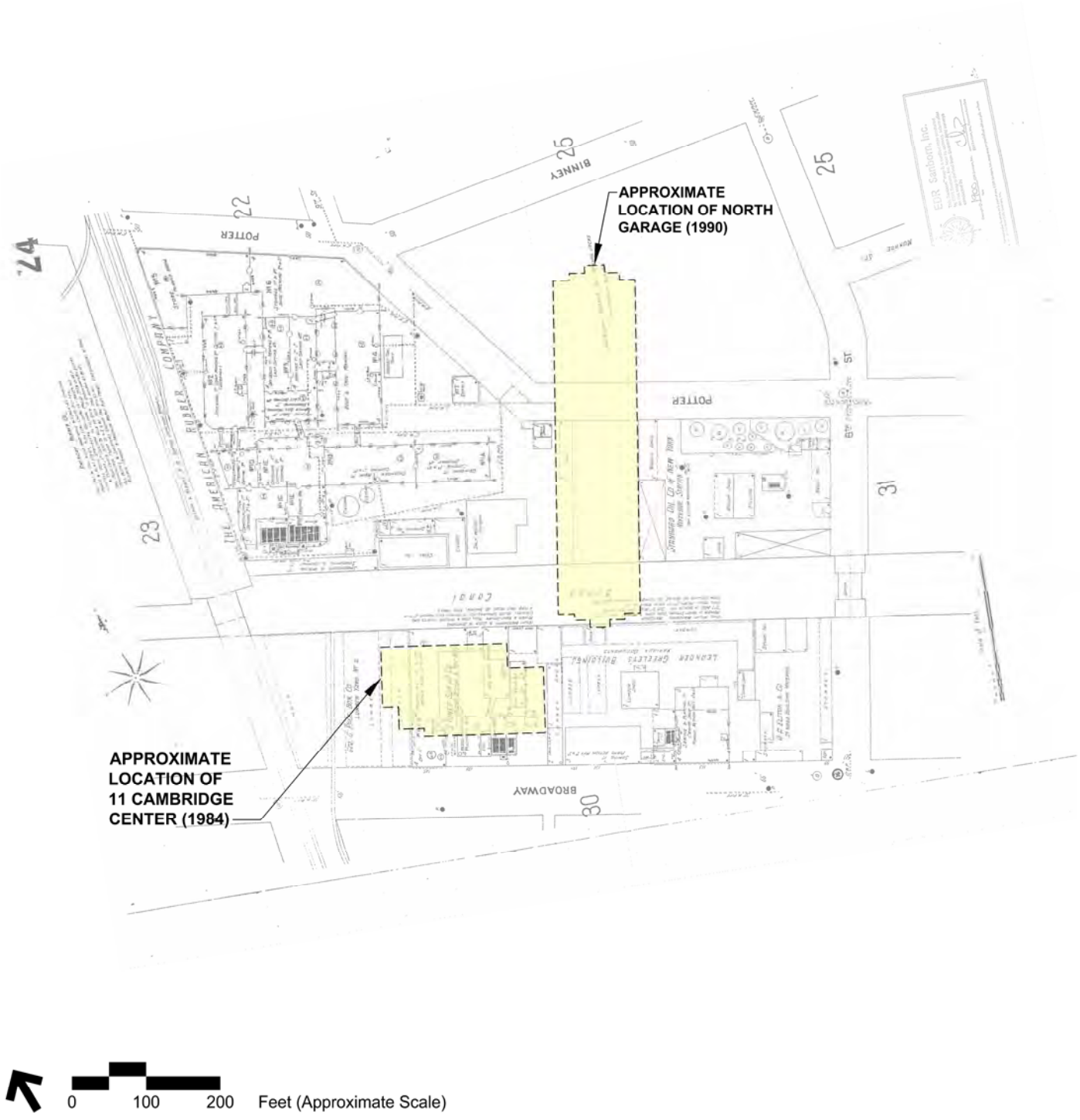
0 150 300 Feet (Approximate Scale)

CRA

Figure 7.1

RTN LOCATIONS

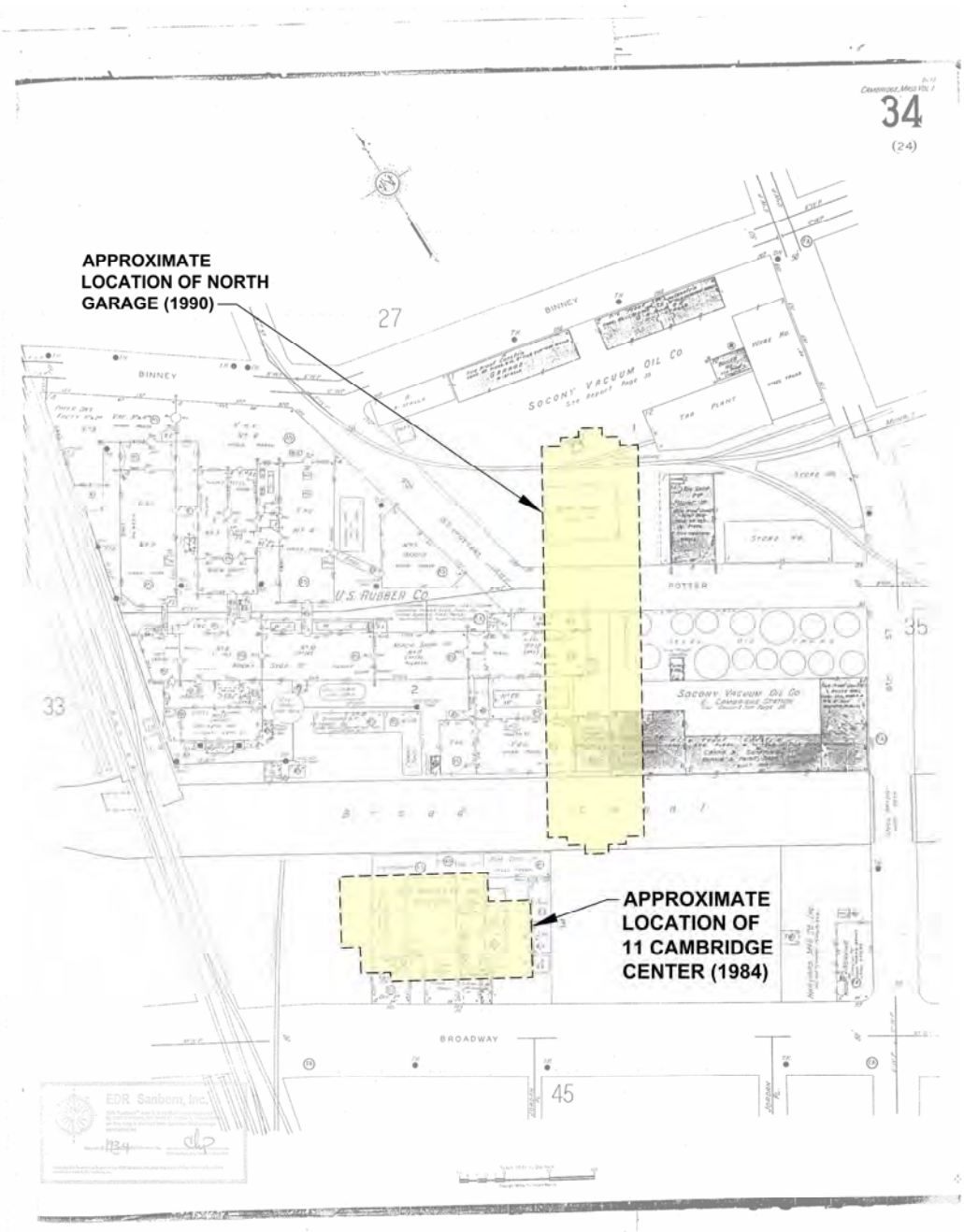
Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



CRA

Figure 7.2 a
Historical Plan 1900 - KSURP Parcel 2

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

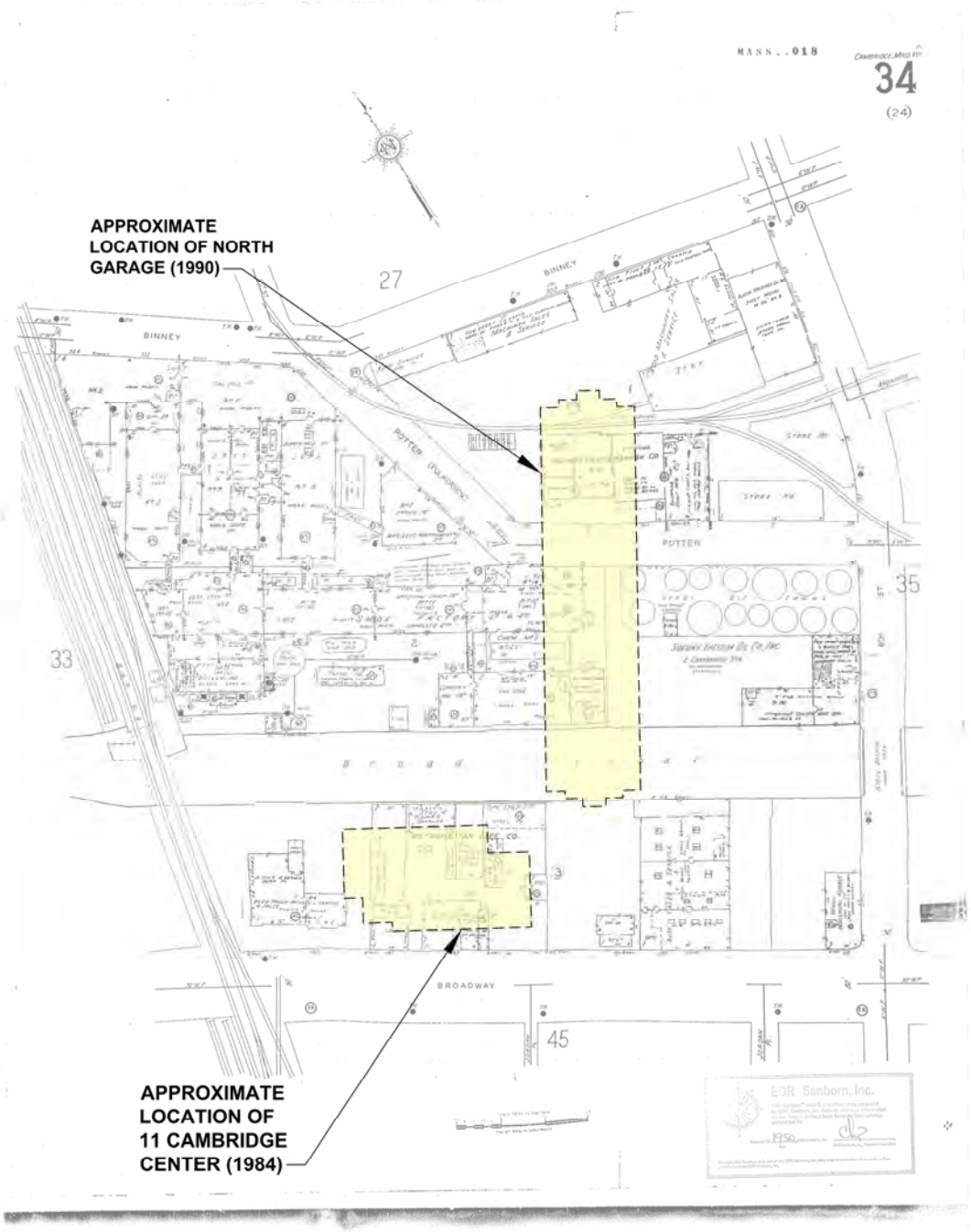


0 100 200 Feet (Approximate Scale)

CRA

Figure 7.2 b
Historical Plan 1934 - KSURP Parcel 2

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

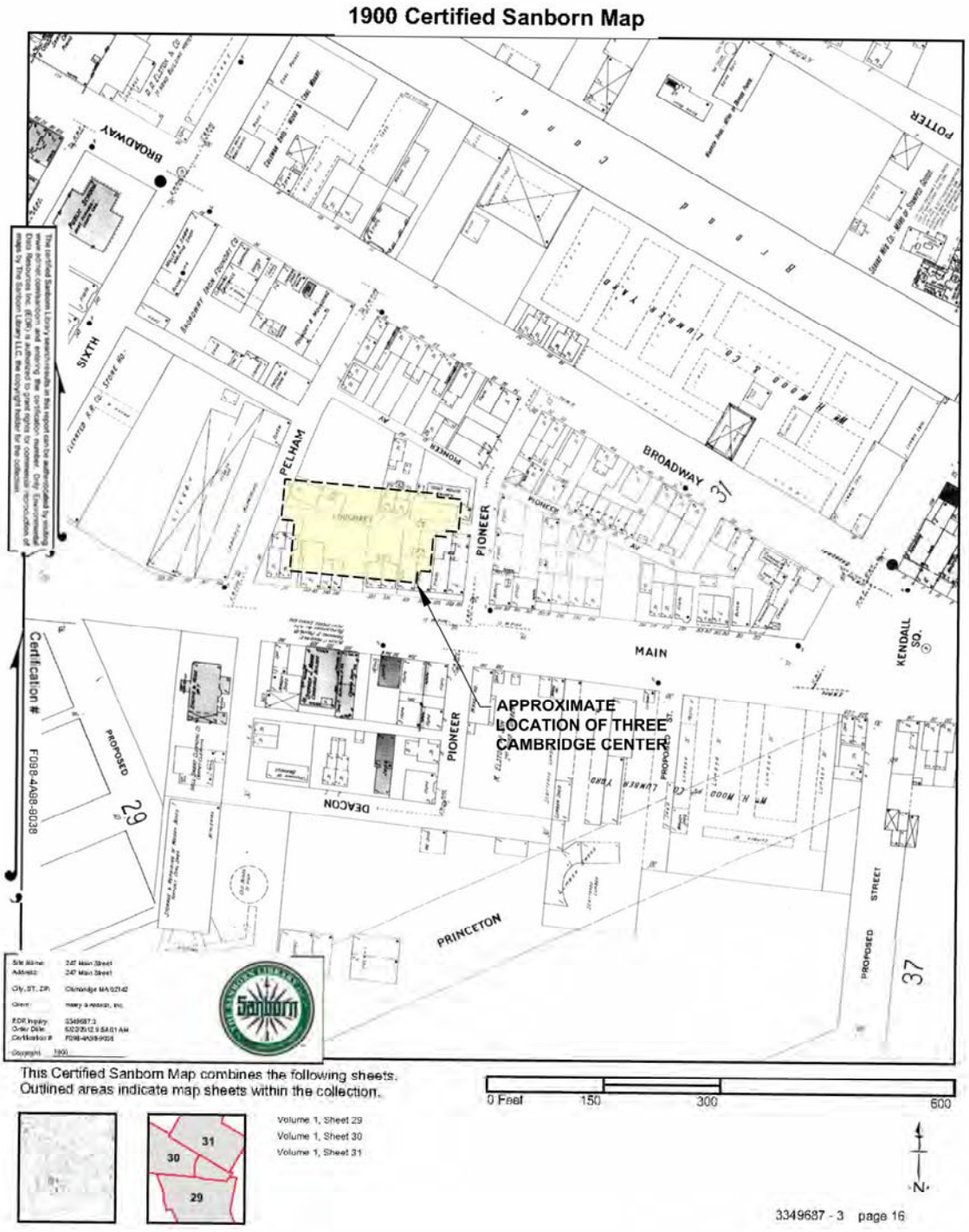


0 100 200 Feet (Approximate Scale)

CRA

Figure 7.2 c
Historical Plan 1950 - KSURP Parcel 2

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

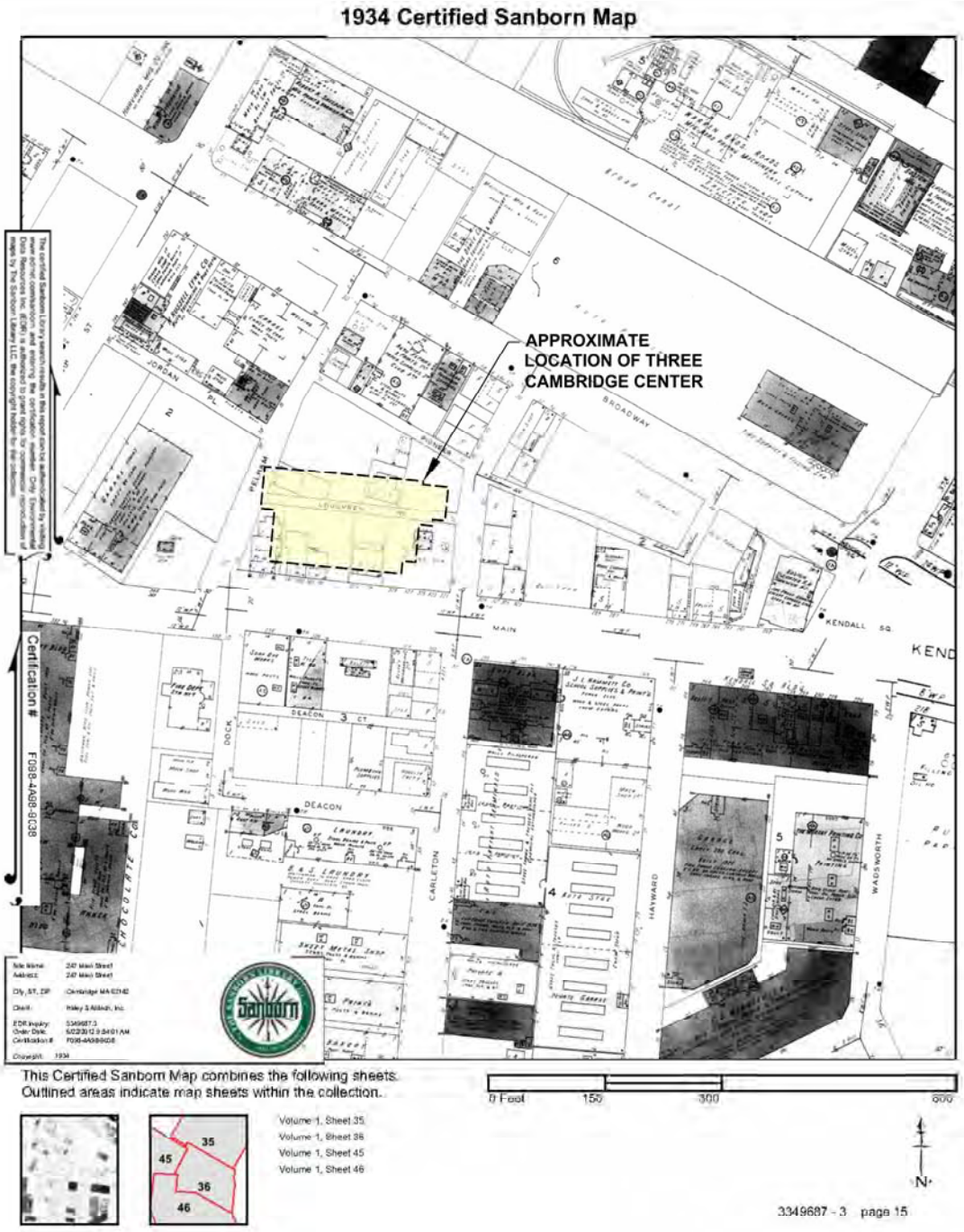


CRA

Source

Figure 7.3a
Historical Plan 1900 - KSURP Parcel 4

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



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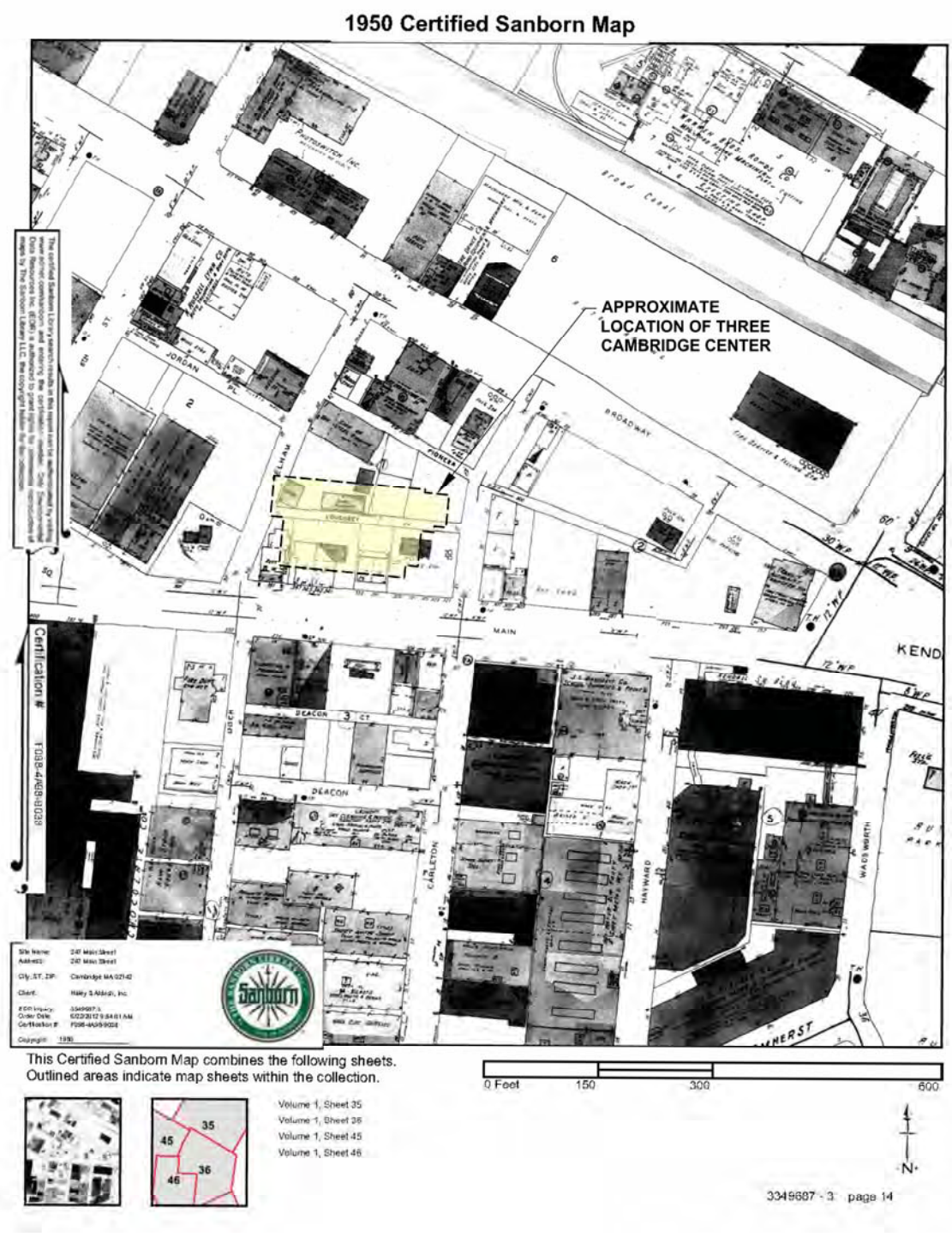
CRA

Source

Figure 7.3b
Historical Plan 1934 - KSURP Parcel 4

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA



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CRA

Source

Figure 7.3c
Historical Plan 1950 - KSURP Parcel 4

Kendall Square Urban Renewal Project Amendment No. 10
Cambridge, MA

8

Construction

Introduction

The following chapter discusses the proposed project phasing, and the potential construction-related impacts and proposed mitigation measures. Construction impacts are temporary in nature and are typically related to stormwater runoff, truck traffic, air quality (dust), noise and construction waste. Temporary construction-period impacts will be managed to minimize disruption to the surrounding neighborhood.

Project Construction Phasing

The proposed Broad Institute mechanical space conversion is expected to begin in 2016 shortly after the plan amendment and zoning are approved. The Whitehead Institute Office Addition is also likely to begin construction in 2017 and is likely to be completed within 12-15 months.

The Project will be constructed in two key phases where Phase 1 will be split into two sub-phases. Phase 1A will consist of the redevelopment of the North Garage with new commercial office/innovation space over the existing garage. Phase 1B will include demolition of the existing Eleven Cambridge Center commercial office building and construction of a new 294-unit residential with ground-floor retail space and below-grade parking. Phase 2 will include demolition of the existing Three Cambridge Center commercial office building and construction of a new mixed use building with commercial office space, ground-floor retail space, and 320 residential units.

The Proponent, Redeveloper and Other Developers will all work with the City, MBTA and local community to coordinate construction and seek to minimize any impacts from demolition and construction of new buildings. Specifically, during Phase 2, the Redeveloper is committed to minimizing potential construction-related impacts to

MBTA service at the Kendall Square/MIT subway station entrance/exit headhouse located in the courtyard area adjacent to Three Cambridge Center.

Temporary Construction Impacts

Construction impacts are temporary in nature and are typically related to stormwater runoff, truck traffic, air quality (dust), noise and construction waste. Temporary construction-period impacts will be managed to minimize disruption to the surrounding neighborhood. Construction Management Plans (CMPs) will be prepared for each Project Component to address numerous temporary construction-related impacts, such as mitigation measures, road closures, detours, and staging. The TP&T will review and approve each CMP. The Redeveloper will work closely with the City throughout the construction of each Project Component.

Over the duration of the Project, there are likely to be other development projects in the areas adjacent to each Project Component. In order to help minimize disruption to local residents and businesses, the Redeveloper is committed to participating in coordinated construction management planning efforts that may be sponsored by the City and/or local community groups. Coordinated construction communication and logistical planning (i.e., signage programs, selective truck routes, etc.) can help mitigate local temporary transportation issues associated with concurrent construction projects.

Because the KSURP area is located in a highly active urban environment, the Project will aim to integrate high quality aesthetics into construction protection fencing and walls along the streetscape that are erected for more than six months. For example, partnerships with local artists, muralists, and schools will be explored as well as highly graphical fence wraps, or fences made from unique materials in unusual forms and colors. Messaging, peek-in plexiglass windows, or interactive displays will also be explored.

Water Quality

Each Project Component is set within sites less than one (1) acre in size and, therefore, do not require a U.S. Environmental Protection Agency Construction General Permit. However, consistent with the sustainability goals, including LEED Certification, each Project Component will comply with National Pollutant Discharge Elimination System (NPDES) to minimize water pollution by regulating point sources that discharge pollutants into local waterways by developing and implementing an Erosion and Sedimentation Control (ESC) Plan. As required by the LEED Pre-requisite, the General Contractor will be required to implement an ESC Plan for each Project Component. Furthermore, any construction dewatering discharges will be appropriately controlled and discharged in accordance with the NPDES state and local dewatering standards.

Construction Truck Traffic

Construction truck traffic will vary throughout the construction period, depending on the work activity. Idling of trucking will not be allowed on-site by the General Contractor. Based on recent redevelopment at Seven Cambridge Center by the Redeveloper, trucking to the construction sites for all project phases is expected to enter from Interstate-93 (I-93) via Route 28, left onto Land Boulevard and right onto Main Street to access Three Cambridge Center and Whitehead Institute (and then right onto Service Road to access the North Garage and Eleven Cambridge Center sites). Leaving the construction site, construction vehicles will exit through Binney Street to Land Boulevard, right onto Route 28 to I-93. Additionally police detail will be provided, as needed. As each Project Component progresses in design and moves into construction, the General Contractor will identify specific truck routes as part of each CMP for TP&T review and approval. These plans will also reflect overlapping construction phases or buildings simultaneously under construction within the vicinity of the KSURP area.

Construction Bicycle and Pedestrian Accommodations

It is extremely important in Kendall Square (especially along Broadway and Main Street) that pedestrian and bicycle accommodations of equivalent width, quality, and accessibility be provided and protected during construction. During construction, the Project will aim to not close any sidewalks and/or bike lanes, but will relocate and/or protect such facilities. All temporary sidewalk and/or bike lane accommodations will be treated as a normal sidewalk and bike lane with regards to winter weather operations (clearing of snow and ice) and extreme rain events (prevent/resolve large puddles), to the extent feasible.

As each Project Component progresses in design and moves into construction, the General Contractor will identify changes required in any bicycle and/or pedestrian routes as part of each CMP for Cambridge TP&T review and approval. These plans will also reflect overlapping construction phases or buildings simultaneously under construction within the vicinity of the KSURP area.

Construction Air Quality

Project-related construction and demolition activities are expected to result in a short-term increase in air pollution emissions associated. The primary sources of potential construction air emissions is from fugitive dust resulting from construction operations (e.g., demolition) and vehicle emissions from construction equipment. Overall, potential impacts on ambient air quality from construction activities associated with site-specific development are temporary and not expected to be significant. Specific measures to be implemented by contractors to reduce potential emissions and minimize impacts include:

- Using wetting agents to control and suppress dust that may come from excavated and construction materials.
- Fully covering all trucks used for transportation of construction debris.
- No site storage of construction debris.
- Daily cleaning of street and sidewalks by mechanical means so as to minimize dust and dirt accumulation.

Fugitive Dust

Fugitive dust consists of soil particles that become airborne when disturbed by heavy equipment operations or through wind erosion of exposed soil after groundcover (either lawn or pavement) is removed. This construction-related air-quality impact (i.e., fugitive dust) would be of relatively short duration.

Dust control measures during dry or windy periods will be implemented. The appropriate methods of dust control would be determined by the surfaces affected (i.e., roadways or disturbed areas) and would include, as necessary, the application of water and/or the use of stone in construction roads and staging areas. Additionally, regular sweeping of pavement of adjacent roadway surfaces during construction will be conducted to minimize the potential for vehicular traffic to create airborne dust and particulate matter.

Construction Vehicle Emissions

Emissions from the operation of construction machinery (i.e., carbon monoxide [CO], nitrogen oxides [NOx], particulate matter [PM], volatile organic compounds [VOCs], and greenhouse gases) are short-term and not generally considered substantial.

Emission controls for construction vehicle emissions will be employed, including, as appropriate, proper maintenance of all motor vehicles, machinery, and equipment associated with construction activities (i.e., the maintenance of manufacture's muffler equipment or other regulatory-required emissions control devices). The state's anti-idling law will be enforced during all construction phases of the Project with the installation of on-site anti-idling signage at loading and drop-off/pick-up/waiting areas. In addition, the Proponent is committed to meeting the requirements the MassDEP State Revolving Fund (SRF) for diesel construction equipment. These require that all non-road diesel equipment rated 50 horsepower or greater that will be used meet EPA's Tier 4 emission limits or be retrofitted with appropriate emission reduction equipment. Emission reduction equipment includes EPA-verified, CARB-verified or MassDEP-approved diesel oxidation catalysts or diesel particulate filters.

Construction Noise and Vibration

The construction activity associated with the Project may temporarily increase nearby sound levels due to the use of heavy machinery. Heavy machinery is expected to be used intermittently throughout the Project's construction phases, typically during daytime periods. The construction phases that will generate the highest sound levels include the demolition of existing structures, site excavation and grading, and construction of the foundation for the proposed buildings. Each CMP will include a construction noise assessment and identify measures to ensure that the City's Noise Ordinance related to construction activities are met. For example, all work the may result in elevation noise levels will be conducted between 7AM (9 a.m. on Saturdays and Holidays). Also, construction work will be prohibited on Sunday unless approval is obtained from the Police Department. Other construction noise mitigation measures will include:

- Initiating a proactive program to ensure compliance with the City's noise limitation policy.
- Using appropriate mufflers on all equipment and regular maintenance of intake and exhaust mufflers.
- Muffling enclosures of continuously running equipment, such as air compressors and welding generators.
- Replacing specific construction operations and techniques by less noisy ones where feasible.
- Selecting the quietest of alternative items of equipment (e.g. electric instead of diesel powered equipment, hydraulic tools instead of pneumatic impact tools).
- Scheduling equipment operations to keep average noise levels low, to synchronize noisiest operations with times of highest ambient levels, and to maintain relatively uniform noise levels.
- Turning off idling equipment.
- Locating noise equipment as far as possible from sensitive areas.

Hazardous Materials and Construction Waste

As discussed in Chapter 7, *Hazardous Materials*, the Project will require characterization of the soil and groundwater conditions for management of contaminated soil during construction and to evaluate the residential use exposure scenario. Construction of below-grade spaces will require removal of the existing historic fill and organic soils that remain. It is anticipated that contaminated groundwater will also be encountered and that treatment of construction dewatering effluent will be required.

Given the construction period of the buildings (1982 to 1990) the presence of asbestos containing material (ACM) is not anticipated. If ACM is encountered during demolition it will be handled appropriately in accordance with state and local regulations. The Proponent is aware of the U.S. EPA Remediation General Permit program and, if applicable, will apply for the permit.

In compliance with MassDEP construction waste/debris regulations, recycling/reuse programs will be developed as part of the CMP and implemented by all construction contractors to reduce the amount of waste that is sent to landfill throughout construction. Measures to reuse/recycling materials associated with building demolition will be evaluated. By keeping the North Garage intact, a significant amount of construction waste associated with demolition and new construction to rebuild a garage structure is eliminated by the Project.

9

Summary of Proposed Mitigation and Beneficial Measures

Introduction

The following chapter presents a consolidated overview of the proposed mitigation, and other environmental and community benefits proposed in order to eliminate, minimize, or mitigate potential impacts from the Project.

Summary of Public Benefits

In the nearly 40 years since the adoption of Plan Amendment No. 1, the Proponent has facilitated many changes to the KSURP, which pale in comparison to the transformation of Kendall Square and the neighborhood around it. Kendall Square has become a center of innovation, creativity and technology, exceeding the expectations of the developers of the original KSURP back in the 1970s. Additionally, as demonstrated by the FST reporting over the last two decades, aggressive implementation of policies to maximize the use of alternative travel modes by the Proponent have been successful at reducing traffic compared to what was historically projected for the KSURP area (Figure 2.1). The KSURP area is

The Project will aim to reflect these changes and chart a new way forward in furtherance of the recommendations from the K2 Study. The Project objectives not only provide for significant urban design and public realm improvements, increased housing opportunities, expanded retail options, job creation and additional tax revenues, but will result in sustainable, smart growth by favoring development in an urban area well-served by public transit over suburban, sprawling development.

Open Space & Public Realm

- Facilitate the creation of the Grand Junction Mulit-Use Path within the MXD District
- Improve efficiency of and enhance public realm surrounding the MBTA Kendall Square/MIT station.
- Generate more activity in the KSURP area beyond the typical business day (i.e., past 7PM) by introducing new residents and ground-floor retail.
- Enhance existing and create new ground level open spaces with multiple outdoor connections to buildings within the KSURP area.
- Create new urban open space opportunities on building rooftops while aiming to improve water quality and reduce heat island effect through green roofs and roof gardens for use by tenants. Implement and/or facilitate streetscape improvements along Broadway and Main Street between Ames Street to Galileo Galilei Way, the Sixth Street Connector, and Galileo Galilei Way between Ames and Binney Streets.

Transportation

- Utilize the extensive existing transportation infrastructure currently serving the Project area, including infrastructure for alternative modes (Red Line, bus routes, EZ Ride, and bicycle and pedestrian facilities, including on-street bike lanes, cycle tracks, sidewalks, crosswalks and multi-use pathways).
- Establish a program in conjunction with MassDOT, MBTA and other stakeholders (the Enhanced Transit Mitigation Program) designed to enhance mobility around the KSURP area, including major transportation initiatives that will improve transit options and services. Initiatives may include a range of projects, programs, and services directed at improving and enhancing transit and other forms of alternative transportation options for people working, living and visiting the Kendall Square area.
- Improve traffic circulation to the local roadway network through intersection improvements.
- Providing additional pedestrian countdown timers at study area intersections.
- Implementing LPI programming at study area intersections.
- Improve lighting on sidewalks and pathways for safer pedestrian accommodations, such as Sixth Street and other active pedestrian walkways in the KSURP area.
- Enhance pedestrian access and circulation through development blocks, including incorporating a new mid-block pedestrian crossing at the Broadway crossing between the proposed North Garage Office Buildings and Danny Lewin Park on the south side of Broadway.

- Enhance bicycle infrastructure at each Project Component and within the KSURP area by connecting this infrastructure with other area-wide improvements.
- Provide secure on-site bicycle storage facility for residents and employees, and exterior at-grade short-term bike parking for visitors and customers, in compliance with the City's bicycle parking requirements.
- Implement a robust TDM plan to reduce single-occupancy vehicles traveling to/from the KSURP area.
- Continue to implement a Transportation Monitoring Program (TMP) to assist in determining the effectiveness of TDM initiatives and traffic mitigation improvements.

Environmental/Sustainability

- Incorporate design and mitigation strategies consistent with the K2 Plan sustainability recommendations, and other local policies and initiatives.
- Optimize existing infrastructure developed to support greater density, such as the infill development proposed as part of the Project.
- Use land efficiently by revitalizing an urban renewal era above-ground parking structure with dense mixed-use development.
- Limit the impact on the climate by reducing Project-related GHG emissions through thoughtful building design and by preserving the embodied energy of existing materials through the reuse of the Cambridge Center North Garage.
- Promote the use of alternative modes of transportation, encourage pedestrian activity and enhance the surrounding neighborhood.
- Promote the use of local materials, provide for a high-quality indoor environment for users, and reduce environmental impacts both locally and globally.
- Incorporate sustainability throughout by thoughtfully planning for efficient use of energy and resources through all stages of design and during operations.
- Develop a framework to develop specific targets, goals and strategies for the Project (i.e. a project sustainability plan) to be used by the design team moving forward through the design process, construction, and into operations.
- Provide a unique and sustainable project through the redevelopment and reuse of the existing North Garage and by utilizing the LEED Green Building Rating System as a tool.
- Incorporate preferential parking for low-emission and clean-fuel vehicles and EV charging stations within the Cambridge Center North Garage and East Garage.
- Provide for beneficial impacts on water quality through the process of redevelopment and updating to current stormwater management standards, including rainwater harvesting for on-site re-use, groundwater recharge, and phosphorous mitigation.

- Lease and operate the buildings in a sustainable manner (i.e., develop Tenant Manual/Guidelines to encourage sustainable design and operation of tenant spaces, such as encouraging the use of LEED-CI).

Social and Economic

- Expand the capacity of one of the top drivers of economic growth for the City, state and region, which is currently constrained by space.
- Support the economic development goals originally set forth by the KSURP by allowing new development and uses, which will bring new residents, customers, and employees.
- Continue to foster the economic activity in Kendall Square through the creation of commercial and innovation space targeted to a mix of tenants from the bio-tech, creative, technology and/or health care industries.
- Provide opportunity for new ground floor retail that supports commercial and residential uses, such as food market or drug store.
- Provide up to 560 new housing units, 15 percent (84 units) of which will be provided at an affordable rate to low- and moderate-income households.
- Create an estimated 2,650 construction jobs in all trades and over 2,600 permanent jobs..
- Create a total of approximately $6.7 million in new annual local tax revenue.

Transportation and Air Quality

As discussed in Chapter 2, *Transportation and Parking*, the Project will have limited impacts to the surrounding transportation infrastructure. The proposed transportation mitigation plan aimed at mitigating these impacts include local intersection improvements (signal timing adjustments and roadway geometric changes) and TDM measures targeted at reducing vehicle trips associated with the Project. The Proponent will work with all stakeholders including MassDOT, MBTA and the City to understand these impacts and establish a plan for mitigation and improvements to various transportation infrastructures. The following sections describe various aspects of the proposed transportation mitigation plan to be discussed in further detail with all stakeholders.

These measures also have local and regional air quality benefits as they aim to reduce the amount of vehicle trips to/from the KSURP area, which results in reduced vehicle air emissions, as demonstrated in Chapter 3, *Air Quality*. The results of the mesoscale air quality analysis demonstrate that the roadway improvements will meet the transportation conformity criteria by reducing VOC, NOx and GHG emissions.

Public Transportation Improvements

The City established a Transit Advisory Committee in May of 2013 to help identify, plan, and provide support to the public transportation problems within the City. The committee published the Cambridge Transit Strategic Plan to identify the current conditions of public transportation in the City and established seven unique goals to help improve the system and provide better services to the residents, businesses and visitors of the City. These goals, listed below, align with the Proponents vision for the KSURP area.

- Mobility
- Funding
- Efficiency and Reliability
- Expansion
- Usability, Accessibility, and Safety
- Public Participation, Support, and Outreach
- Resiliency

The Proponent is currently discussing these goals and future vision of public transportation in the KSURP area with stakeholders, including the MBTA and the City. The Proponent will also consider the outcomes of the Task Force mobility study when discussing appropriate public transportation improvements. The process will ultimately lead to a plan, agreed upon by all involved parties, of mitigation measures the Proponent will implement to improve the public transportation infrastructure and experience within the KSURP area.

Enhanced Transit Mitigation Program

The Proponent and the Redeveloper remain focused, , as they have throughout the development of Cambridge 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 area. It is acknowledged and well documented that 70 percent of 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 Proponent's plans for expansion of the KSURP.

The Proponent and Redeveloper are committed to developing an expanded program of transportation mitigation and enhancements designed to both preserve the favorable mode share balance in Kendall Square and provide additional improvements to mitigate the trip generation projected to result from the Project. The ETMP will be developed in conjunction with the many stakeholders engaged in

transportation planning and operations in Kendall Square, including the Task Force, the MBTA, and MassDOT. The ETMP would supplement the proposed transportation mitigation measures outlined in this NPC.

The Proponent and Redeveloper have engaged in preliminary discussions with MassDOT and the MBTA to discuss 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 ETMP program. The ETMP would be designed to enhance access to and mobility around Kendall Square, which the Proponent believes is critical to the long-term economic success of the area. It is expected that the ETMP will be focused on major transportation initiatives that will improve transit options 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 ETMP would focus on enhancements to transit and other non-single occupancy vehicle transportation alternatives. 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 Proponent recognizes that the development of the ETMP will require detailed consideration and analysis of the enhancement alternatives, as well as careful coordination with the stakeholders and service providers. As stated above, the Proponent believes that this analysis can be undertaken in conjunction with the Task Force. 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 Proponent, in coordination with the City, will work with Mass DOT and the MBTA to develop the elements of the ETMP, which can be refined supplemented over time as the Task Force completes it work.

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

Over the coming months, the Proponent will be working closely with the City, the MBTA and MassDOT to develop and refine the ETMP proposal, including additional details on the potential source of these funds and the range of transit mitigation projects and program options for consideration, including:

- **Kendall Square Transit Enhancements** - Other options and services to be explored, including capital and service investments to develop new transit services on the Grand Junction railroad corridor on the western edge of Kendall Square, as previously proposed;
- **MBTA Red Line Kendall Station Improvements** - Enhancements to station access (incorporating ADA compliance), improvements to station communication systems, platform improvements, MBTA passenger experience enhancements, resilience enhancement measures;
- **MBTA Kendall Station / Kendall Square Connections** - Improved connections to MBTA Orange Line and Green Line Service, utilized by Kendall Square workers during peak AM and PM hours, provision of coordinated shuttle bus and other services on a scheduled and long-term basis, other potential bus access, comfort and related service improvements; and
- **MBTA Red Line Service Improvements** - Measures to improve service frequency and reliability and/or capacity, including potential MBTA signal improvements, to be developed in close coordination with and integrated into short-term and long-term MBTA capital planning.

Vehicular Access and Circulation Improvements

The LOS analysis performed at the study area intersections indicate that there are intersections where improvements can be made to reduce vehicle delay and enhance the overall intersection operations. These intersections have been studied from a vehicular operations standpoint and possible improvements have been suggested below. These suggested improvements will be discussed in detail with all stakeholders in the broader context of other proposed improvements. The final design and implementation of any vehicular access and circulation improvements associated with the Project will be agreed upon by all involved parties.

The Proponent understands that other users including pedestrian and bicyclist use these intersections and any improvements made need to consider the safety of all users. Therefore, additional studies may need to be done to ensure improvements at study area intersections have considered all user groups and maintained or improved safety and operations for all. The intersections studied for the purposes of this mitigation analysis are summarized below (refer to Chapter 2, *Transportation and Parking* for further details):

- **Cambridge Street/Third Street** – PM signal optimization;
- **Broadway/Galileo Galilei Way** – Signal optimization with permitted left turns;
- **Main Street/Vassar Street/Galileo Galilei Way** – Protected east/west left turn phase and signal optimization;
- **Memorial Drive/Route 3/Ames Street** – Additional right-turn only lane on Ames Street; and

- **Massachusetts Avenue/Memorial Drive Off-Ramps** – Signal optimization with right-turn on red.

The proposed mitigation at each of the intersections is documented. Refer to Chapter 2, *Transportation and Parking* for the 2024 Build Mitigated LOS analysis was performed to quantify the improved traffic operations at these intersections. The proposed vehicular improvements to particular intersection timings and phasing will maintain current cycle times as to not greatly impact pedestrian wait times at these intersections All intersections with proposed mitigation will continue to provide adequate walk time for pedestrians of all abilities to safely cross the intersection. The Proponent will work with the City to determine the specific vehicular access and circulation improvements to be made within the study area.

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 LPI programming and many of the signalized intersections within the KSURP area have pedestrian countdown timers with such technology.

The Project is 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 Proponent will work 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 North Garage Office Buildings 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 for the implementation of a HAWK system.
- Review all pedestrian crossings within the KSURP boundaries to assess their potential for 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 connection to buildings within the KSURP area.
- Support roadway and streetscape improvements along Galileo Galilei Way between Binney and Main Streets.

Bicycle Facilities

As discussed previously, the KSURP area is well serviced by bicycle facilities, including on-street bike lanes, cycle tracks, and multi-use pathways. As shown in Figure 2.6, the City and other improvement projects will further add to the bicycle infrastructure in the area.

The Proponent is committed to enhancing bicycle infrastructure at each Project Component and within the KSURP area by connecting this infrastructure with other area-wide improvements. The Proponent will discuss with the City the possibility of contributing to the proposed infrastructure improvements within the area, including the cycle track along Galileo Galilei Way and the Grand Junction Multi-Use Path. Additionally, in close coordination with the City, the Redeveloper, and Other Developers, the Proponent will also explore opportunities to create a full service bike station within the area.

The Project will provide approximately 800 long-term bicycle spaces and 142 short-term bicycle spaces, in accordance with the City's bike storage requirements. The long-term secure bicycle spaces will be distributed between the North Garage, West Garage, East Garage, Eleven Cambridge Center Garage and Three Cambridge Center. Short-term outdoor spaces will be distributed around the KSURP area, focusing on areas around the Project Component sites.

Transportation Demand Management Measures

The proposed TDM 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 as well as Project-specific measures. 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 will be implemented as part of the Project:

- Appropriate pricing of parking – market rate paid by employees.
- 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 a transit subsidy (exact terms to be based on City coordination).
- Provide free access to EZRide shuttle to Lechmere and North Station.
- Provide adequate bicycle parking and benefits including Hubway availability and possible membership subsidy.
- Determine the feasibility of implementing or sponsoring a car-sharing program, such as ZipCar®.
- Provide designated car-share parking spaces within and/or nearby Cambridge Center parking garages to the car-share business, if deemed feasible.
- 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 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 Two Cambridge Center, and One and Three Cambridge Center on Parcel 4.
- Continue to participate in the Charles River TMA.

Traffic Monitoring Program

The KSURP area currently has a traffic monitoring program established by MEPA for Amendment 3 in 1994. An annual report is issued discussing the daily vehicle volumes, trip generation rates, estimated development generated trips and garage occupancy counts. The KSURP monitoring program and annual reporting will continue as part of the Project with adjustments to the format of the report to be made in conjunction with MEPA and the City.

Greenhouse Gas Emissions

As discussed in Chapter 4, *Sustainability and Greenhouse Gas Emissions Assessment*, the Project's sustainable design goals and operational measures demonstrate that the Proponent is committed to constructing and operating a sustainable and environmental-sensitive development. Specifically, the incorporation of the sustainable design principles and measures currently being considered will result in an overall reduction in Project-related stationary source and mobile source GHG emissions.

The GHG emissions assessment provided in Chapter 4 demonstrates that the Project meets the intent and requirements of the MEPA GHG Policy because it estimates potential Project-related GHG emissions and evaluates and incorporates measures to reduce the GHG emissions to the extent practical and feasible. The GHG emissions assessment is based upon the best information available at the current planning phase. The Project has been designed to meet the current Stretch Energy Code (i.e, a minimum 20 percent energy savings over ASHRAE 90.1-2007 standards). Overall, the Project, as currently designed, is projected to result in an energy savings of approximately 25 percent compared to the Base Energy Code requirements based on preliminary building energy model results. This energy savings equates to an estimated 17 percent reduction in stationary source CO_2 emissions. Furthermore, the GHG assessment demonstrates the additional building improvements required to meet the future potential Stretch Energy Code requirements currently under consideration.

As a result of transportation-related mitigation, including site access and local roadway improvements as well as a robust TDM plan (described above), the Project is projected to reduced mobile source CO_2 emissions by an estimated 105 tons per year. This reduction also accounts for the mobile source GHG emissions benefits associated with the Project's urban location (i.e., walkability), existing bicycle facilities, and direct access to an extensive network of public transportation (i.e., the MBTA Red Line at Kendall Square/MIT station).

The Proponent will submit a self-certification, signed by an appropriate professional, to the MEPA Office that identifies the as-built energy conservation measures and documents the stationary source GHG emissions reductions from the baseline case for each Project Component post-construction, as required by the MEPA GHG Policy.

Stormwater Management

As discussed in Chapter 5, *Stormwater Management*, all Project Components will be required to mitigate stormwater runoff to comply with MassDEP standards and the even more stringent City requirements. Compliance will be achieved through the implementation of BMPs in the stormwater management design. Stormwater

infrastructure will be designed and installed at Project Component site, as required, to reduce the runoff discharge rate and improve the quality of the runoff to the Cambridge stormwater system and the Charles River basin. Proposed site design measures being considered are described below. In addition, the Proponent will coordinate with DPW to explore creative solutions to stormwater management that go beyond the scope of individual Project Components to provide a more district-wide solutions.

As the limits of the developments have not been set, stormwater control measures will be investigated as each development undergoes their respective design processes. The Proponent will consider several stormwater quantity and quality control measures as part of this process. These control measures include, but are not limited to, the following:

- Subsurface infiltration systems
- Green roofs
- Rainwater harvesting
- Permeable pavements
- Proprietary treatment devices
- Bioretention landscaped areas and streetscape designs
- Deep sump, hooded catch basins

Per the requirements set forth by the City, the Project will be required to mitigate stormwater effluent from the post-development 25-year design storm to the rates of the pre-development 2-year design storm, as well as reduce TSS by 80 percent from the pre-development condition. While the Proponent intends to meet these base requirements, it will also seek to replace some of the on-site stormwater mitigation strategies through supporting efforts by the City to increase stormwater capacity in the Kendall Square area. As the Project develops, the Proponent will coordinate with DPW to determine if support can be given to neighborhood-scale stormwater projects in lieu of some on-site stormwater mitigation infrastructure.

Water and Wastewater

Water Demand

As discussed in Chapter 6, *Water and Wastewater*, domestic water and fire protection services will be supplied by local water mains in central Cambridge to each of the Project Components. The water system is maintained by the CWD, who reviews the design of all connections to their services. Systems will be made as redundant where possible. Although there are some large 30-inch transmission lines in the area, each

development will focus on connecting to 12-inch and 16-inch water mains. The CWD indicated that local infrastructure should have sufficient capacity to serve the Project based on the building program. Each Project Component will likely require booster pumps for domestic water and fire protection, as the Kendall square water system has relatively low pressure for the types of buildings in this Project.

The Project will attempt to conserve water through several methods including low flow plumbing fixtures, efficient air conditioning systems, and explore the viability of alternate water sources, such as greywater or rainwater harvesting.

Wastewater

The Project's proposed 1,034,000 million square feet of added uses will generate significant additional wastewater flows. Overall, the Project is projected to generate an estimated 107,945 gpd of new wastewater flows. MassDEP no longer requires self-certifications, as they have an agreement with the City for project reviews concerning wastewater. In order to obtain a municipal sewer connection permit, the City requires new developments to reduce stormwater inflow and infiltration (I/I) at a ratio of 4:1 from the Cambridge Sewer System. This requirement stems from capacity issues as a whole in the City sewer system, which causes combined sewer overflows during large precipitation events. Therefore, at this stage of the design, it is anticipated that the Project will be required to remove 431,780 gpd of stormwater from the sewer system, which is four (4) times the overall estimated sewage generation. This I/I reduction will be accomplished by coordinating with the City to either correct I/I issues in the vicinity of the Project or pay for projects the City is performing in an effort to reduce I/I.

Hazardous Materials

Compliance with MCP

The Project will require characterization of the soil and groundwater conditions for management of contaminated soil during construction and to evaluate the residential use exposure scenario. It is assumed that testing of soil and groundwater at the Cambridge Center North Garage and Eleven Cambridge Center will result in a new reporting condition to MassDEP and that activities at the properties would be subject to the requirements of the MCP, 310 CMR 40.0000. It is anticipated that conditions in the area outside Three Cambridge Center will encounter similar contaminant levels in soil as those encountered during the recent plaza improvement and connector work at Three, Four, and Five Cambridge Center and, therefore, it is likely that new activities can proceed under the existing RTN. However, testing of groundwater may result in a new reporting condition.

The management of contaminated soil and groundwater, and implementation of measures to reduce the risk of exposure to contaminants at each Project Component site will be conducted under a Release Abatement Measure (RAM) Plan. It is anticipated that the measures undertaken under the RAM will result in achieving a Permanent Solution for each property redevelopment.

A summary of the anticipated assessment and remedial activities for each property is summarized below.

Cambridge Center North Garage Office Buildings

As previously mentioned, no below-grade space exists below the Cambridge Center North Garage. Construction of below-grade space will require removal of the existing historic fill and organic soils that remain. New foundations will be required to support loads imposed by the planned additional levels of above-grade parking and commercial space. It is anticipated that a majority of the historic fill and underlying soils will be impacted with petroleum oils and hazardous materials and, therefore, characterization of soil materials in-place prior to excavation is planned as part of the Project. It is anticipated that contaminated groundwater will also be encountered and that treatment of construction dewatering effluent will be required. It may also be necessary to install a vapor mitigation system under all occupied spaces to eliminate the vapor intrusion pathway based on the outcome of the groundwater data.

Eleven Cambridge Center Residential Building

As previously mentioned, it is possible that groundwater at Eleven Cambridge Center could be impacted. Groundwater testing and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use. No basement exists below the ground floor of Eleven Cambridge Center. Construction of below-grade parking will require removal of the existing fill and act to eliminate the vapor intrusion pathway to residences. It is anticipated that a small volume of contaminated soil will be encountered during excavation and, therefore, characterization of soil materials in-place prior to excavation is planned as part of the Project. The initial phase of the characterization program would take place prior to building demolition at the exterior of the existing building. A second characterization phase would occur following building demolition and removal of the existing footing foundations. Groundwater testing and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use although the presence of below-grade parking will act to eliminate the vapor intrusion pathway to residences.

Three Cambridge Center Mixed Use Building

The presence of contaminated soil is not anticipated below the excavated portions of the property, however additional deeper excavation would require sampling and testing of soil prior to new construction. However, based on recent soil testing conducted in the unexcavated portions of the area around Three, Four, and Five Cambridge Center for recent plaza, it is anticipated that soil beneath the unexcavated portions of the plaza area around Three Cambridge Center will detect levels of VOCs, metals, and PAH that will require management as contaminated soil that can be managed as a Post-RAO construction activity. Additionally, while groundwater contamination has not been encountered historically, low levels of VOCs are anticipated to be present. Levels of contaminants that exceed the applicable Reportable Concentrations in groundwater will require new reporting under the MCP and the potential for vapor intrusion will need to be evaluated as part of the proposed residential use under this new RTN.

Construction

As discussed in Chapter 8, *Construction*, the Proponent will develop a CMP for each Project Component. The purpose of the CMP is to develop a proactive approach to identify and address the potential impacts on the community that may arise during construction and to minimize these impacts where possible. The CMP will aim to address impacts of the Project-related construction activities on the City, the public ways/spaces, and the on-site MBTA facilities, where applicable. The Cambridge Traffic, Parking & Transportation Department will review and approve each CMP. The Redeveloper will work closely with the City throughout the construction of each Project Component.

The Redeveloper is committed to minimizing impacts to service at and access to the Kendall Square/MIT subway station throughout construction of the Project, but particularly during Phase 2 (construction of the residential and commercial at Three Cambridge Center). Furthermore, a key goal of the Project is to not close any sidewalks and/or bike lanes during construction activities. All pedestrian and bike accommodations will be relocated, if needed, and/or protected. Any temporary facilities will be maintained as a normal sidewalks and bike lanes with regards to winter weather operations (clearing of snow and ice) and extreme rain events (prevent/resolve large puddles), to the extent feasible.

Over the duration of the Project, there are likely to be other development projects in the areas adjacent to each Project Component. In order to help minimize disruption to local residents and businesses, the Redeveloper is committed to participating in coordinated construction management planning efforts that may be sponsored by the City and/or local community groups. Coordinated construction communication and logistical planning (i.e., signage programs, selective truck routes, etc.) can help

mitigate local temporary transportation issues associated with concurrent construction projects.

Proposed Mitigation Implementation Plan

Table 9-1 below presents the proposed mitigation implementation plan associated with anticipated implementation schedule and milestones as well as parties responsible for implementation.

Table 9-1 Proposed Mitigation Implementation Plan

Mitigation Measure	Responsible Party[1]	Whitehead Institute	Phase 1A	Phase 1B	Phase 2
Transportation[2]					
Public Transportation Improvements					
Establish the ETMP in coordination with MassDOT, MBTA and the City.	Proponent		X		
Implement the projects, program, and service improvements of the ETMP, in coordination with MassDOT, MBTA, and the City.	Proponent & Redeveloper		X	X	X
Vehicular Access and Circulation Improvements					
Analyze and propose adjustments to signal timing and phasing for study area local intersections, as appropriate, in coordination with the City.	Redeveloper		X	X	X
Pedestrian Access, Safety & Streetscape Improvements					
Improve study area intersections to accommodate pedestrians (countdown timers, LPI programming).	Redeveloper/Other Developers	X	X	X	X
Incorporate a new mid-block pedestrian connection at Broadway to the North Garage Office Buildings and Danny Lewin Park.	Redeveloper		X		
Review all pedestrian crossings to assess their potential for bulb-outs, raised crossings, pedestrian refuge islands, Rectangular Rapid Flashing Beacons (RRFB′s), realigned non-apex ramps and/or other treatments to enhance the comfort and visibility of crosswalks.	Proponent & Redeveloper	X	X	X	X
Improve the Sixth Street Connector.	Proponent & Other Developers		X		
Enhance the Main Street streetscape between Ames Street and Galileo Galilei Way.	Proponent & Redeveloper	X			
Enhance the Broadway streetscape from Ames Street to Galileo Galilei Way.	Proponent & Redeveloper		X	X	
Enhance the Binney Street and Galileo Galilei Way streetscape from Sixth Street to Broadway.	Proponent & Redeveloper		X		
Improve pedestrian safety by enhancing lighting along sidewalks and pathways for safer pedestrian accommodations.	Proponent & Redeveloper	X	X	X	X

Table 9-1 Proposed Mitigation Implementation Plan

Mitigation Measure	Responsible Party[1]	Whitehead Institute	Phase 1A	Phase 1B	Phase 2
Pedestrian Access, Safety & Streetscape Improvements (Continued)					
Enhance open spaces with multiple outdoor connection to buildings within the KSURP area.	Redeveloper		X	X	X
Support roadway and streetscape improvements along Galileo Galilei Way between Binney and Main Streets.	Proponent				X
Bicycle Facilities					
Enhance bicycle infrastructure at each Project Component and within the KSURP area by connecting this infrastructure with other area-wide improvements, in coordination with the City.	Proponent		X		
Provide on-site bicycle storage for tenants and exterior short-term bicycle parking for visitors.	Redeveloper	X	X	X	X
Explore opportunities to create a full service bike station within the area.	Proponent		X		
Transportation Demand Management Plan[2]	Redeveloper/Future Employers		X	X	X
Transportation Monitoring Program[2]	Proponent	X	X	X	X
Greenhouse Gas Emissions					
Incorporate key elements of sustainable and high performance building design to increase energy efficiency and reduce stationary source GHG emissions.	Redeveloper/Other Developers	X	X	X	X
Utilize LEED Green Building Rating Systems for incorporating sustainable elements into all Project Components.	Redeveloper/Other Developers	X	X	X	X
Reduction in mobile source GHG emissions through the implementation of the above-referenced transportation-related mitigation measures, including site access and local roadway improvements, and implementation of a robust TDM Plan.	Redeveloper/Other Developers	X	X	X	X
Climate Change Resiliency					
Consider climate change impacts (i.e., potential sea level rise, extreme weather events) in site and building design, where applicable and feasible.	Redeveloper		X	X	X

Table 9-1 Proposed Mitigation Implementation Plan

Mitigation Measure	Responsible Party[1]	Whitehead Institute	Phase 1A	Phase 1B	Phase 2
Infrastructure					
Stormwater Management					
Install on-site stormwater management and treatment systems that will improve water quality, reduce runoff volume, and control peak rates of runoff in comparison to existing conditions, in compliance with current City requirements and MassDEP stormwater management standards.	Redeveloper/Other Developers	X	X	X	X
Water/Wastewater					
Implement 4:1 I/I removal through contribution to City's I/I mitigation fund.	Redeveloper		X	X	X
Install low-flow and low-consumption plumbing fixtures to reduce overall water consumption.	Redeveloper/Other Developers	X	X	X	X
Hazardous Materials					
Develop a RAM Plan to manage contaminated soil and/ groundwater (if encountered) and implement measures as required to reduce the risk of exposure of contaminates at each Project Component.	Redeveloper		X	X	X
Construction Management					
Develop and implement a comprehensive Construction Management Plan (CMP) to mitigate temporary construction-related impacts	Construction Manager	X	X	X	X
Coordinate with other nearby private & public construction projects	Construction Manager	X	X	X	X

1 The Proponent is the CRA and the Redeveloper is Boston Properties. Other Developers represents the developers for the Whitehead Institute and Broad Institute Project Components.
2 Refer to Chapter 2, *Transportation and Parking* of this NPC for additional details.

Appendix A
NPC Distribution List

NPC Distribution List

In accordance with Section 11.10(7) of the MEPA regulations the Proponent has distributed this "expanded" Notice of Project Change (NPC) to the following state and local agencies as well as other interested parties.

It is anticipated that this NPC will be noticed in the next edition of the *Environmental Monitor* published on or about April 22, 2015 commencing the 30-day public review period, in accordance with Section 11.06(3) of the MEPA regulations. Thus, comments on this NPC are due to the MEPA Office no later than May 22, 2015. To request a copy of this document, please contact Lauren DeVoe at (617) 728-7777 or email at ldevoe@vhb.com.

Comments on this NPC can be submitted to the MEPA Office at the following address:

Secretary Matthew A. Beaton
Executive Office of Energy and Environmental Affairs
Attention: MEPA Office re: EEA No. 1891
100 Cambridge Street, Suite 900
Boston, MA 02114

State Agencies

Secretary Matthew A. Beaton (submitted herein)
Executive Office of Energy and Environmental Affairs
Attn: MEPA Office
100 Cambridge Street, Suite 900
Boston, MA 02114

Department of Environmental Protection
Commissioner's Office
One Winter Street
Boston, MA 02108

DEP/Northeast Regional Office
Attn: MEPA Coordinator
205B Lowell Street
Wilmington, MA 01887

Massachusetts Department of Transportation
Public/Private Development Unit
Attn: Lionel Lucian
10 Park Plaza
Boston, MA 02116

Massachusetts Department of Transportation - District #6
Attn: MEPA Coordinator
185 Kneeland Street
Boston, MA 02111

Massachusetts Historical Commission
The MA Archives Building
220 Morrissey Boulevard
Boston, MA 02125

Metropolitan Area Planning Commission
60 Temple Place, 6th Floor
Boston, MA 02111

Massachusetts Department of Housing & Community Development
Attn: Carol Wolfe, Community Revitalization Coordinator
100 Cambridge Street, Suite 300
Boston, MA 02114

Massachusetts Water Resource Authority
Attn: Marianne Connolly
Charlestown Navy Yard
100 First Avenue, Building 39
Boston, MA 02129

Massachusetts Department of Energy Resources
Attn: MEPA Coordinator
100 Cambridge Street, 10th Floor
Boston, MA 02114

Massachusetts Bay Transit Authority
Attn: Andrew Bennan
10 Park Plaza, 6th Fl.
Boston, MA 02116-3966

Massachusetts Department of Conservation and Recreation
Attn: MEPA Coordinator
251 Causeway St. Suite 600
Boston MA 02114

City of Cambridge

Cambridge City Council
Attn: City Clerk
795 Massachusetts Ave
Cambridge MA 02139

Cambridge Community Development Department
Attn: Iram Farooq, Acting Assistant City Manager
344 Broadway
Cambridge, MA 02139

Cambridge Conservation Commission
Attn: Jennifer Letourneau, Director
344 Broadway
Cambridge, MA 02139

Cambridge Public Health Department
119 Windsor Street, Ground Level
Cambridge, MA 02139

Richard C. Rossi, City Manager
City Manager's Office
Cambridge City Hall
795 Massachusetts Avenue
Cambridge, MA 02139

Cambridge Traffic, Parking & Transportation Department
Attn: Joe Barr, Director
344 Broadway
Cambridge MA 02139

Cambridge Community Development Department
Environmental and Transportation Planning Division
Attn: Susanne Rasmussen
344 Broadway
Cambridge, MA 02139

Cambridge Public Works Department
Attn: Owen O'Riordan, Commissioner
147 Hampshire St
Cambridge MA 02139

Cambridge Water Department
Attn: Sam Corda, Managing Director
250 Fresh Pond Parkway
Cambridge MA 02138

Cambridge Redevelopment Authority
Attn: Kathleen Born, Chair of CRA Board
255 Main Street, 4th floor,
Cambridge, MA 02142

Other Reviewers

Congressman Michael E. Capuano
110 First Street
Cambridge, MA 02141

Central Transportation Planning/ Boston Region Metropolitan Planning Organization
State Transportation Building
10 Park Plaza, Suite 2150
Boston, MA 02116

Whitehead Institute
Attn: Martin Mullins, Vice President
Nine Cambridge Center
Cambridge, MA 02142

Broad Institute
Attn: Alan Fein, Executive Vice President
77 Ames Street
Cambridge, MA 02142

Biogen
Attn: Ed Dondero, Director of Facilities
14 Cambridge Center
Cambridge, MA 02142

Robert Johns, Director
Volpe, The National Transportation Systems Center
55 Broadway
Cambridge, MA 02142

Xenia Hotels
Attn: John Wilmoth, General Manager
120 Broadway
Cambridge, MA 02142

Brian Dacey
Cambridge Innovation Center
1 Broadway, 14th Floor
Cambridge, MA 02142

Stephen Kaiser
191 Hamilton Street
Cambridge, MA 02139

Appendix B
Most Recent Previous MEPA Certificate

The Commonwealth of Massachusetts
Executive Office of Energy and Environmental Affairs
100 Cambridge Street, Suite 900
Boston, MA 02114

Deval L. Patrick
GOVERNOR

Timothy P. Murray
LIEUTENANT
GOVERNOR

Ian A. Bowles
SECRETARY

Tel: (617) 626-1000
Fax: (617) 626-1181
http://www.mass.gov/envir

June 25, 2010

CERTIFICATE OF THE SECRETARY OF ENERGY AND ENVIRONMENTAL AFFAIRS
ON THE
NOTICE OF PROJECT CHANGE

PROJECT NAME	: Kendall Square Urban Renewal Area
PROJECT MUNICIPALITY	: Cambridge
PROJECT WATERSHED	: Boston Harbor (Charles River)
EOEA NUMBER	: 1891
PROJECT PROPONENT	: Cambridge Redevelopment Authority
DATE NOTICED IN MONITOR	: N/A

Pursuant to the Massachusetts Environmental Policy Act (G. L. c. 30, ss. 61-62I) and Section 11.06 of the MEPA regulations (301 CMR 11.00), I hereby determine that this project change is insignificant and does not require the preparation of an Environmental Impact Report.

MEPA History and Jurisdiction

The project was the subject of previous review under MEPA, beginning with an Environmental Notification Form (ENF) in 1975, and including both Draft and Final Environmental Impact Reports (EIRs) in 1977 and 1978 respectively, both of which were found to be adequate. The project was also the subject of four Notices of Project change (NPCs), none of which required further review under MEPA. As of the last NPC, the project entailed the redevelopment of 24 acres in the Kendall Square Urban Renewal Area with 3,077,000 square feet (sf) of space, including 171 to 232 housing units.

The project as previously reviewed was subject to a mandatory EIR pursuant to Sections 11.03(l)(a)(2) and 11.03(6)(a)(6) of the MEPA regulations because it required State Agency Action(s), created more than 10 acres of new impervious surface and generated more than 3,000 new average daily vehicle trips.

Project Change Description

The current NPC describes a plan amendment entailing the addition of 300,000 sf of research and development space to, and the reduction of 75,000 sf of high-rise multi-family residential space from, the overall project. According to the traffic impact analysis submitted with the NPC, this change is not projected to result in a significant change to traffic generation and no new parking spaces are proposed. In fact, the analysis concluded that the proposed plan amendment would result in decreased average daily and peak hour trips. The project change is also expected to result in a decrease in projected water use and wastewater generation of approximately 2,250 gallons per day.

Conclusion

After a review of the NPC, I find that the proposed project change is insignificant, in accordance with the MEPA regulations at 301 CMR 11.10(6). No further review of the project is required as a result of the proposed change.

June 25, 2010
Date

Alicia McDevitt, Assistant Secretary,
for Ian A. Bowles
Secretary

IAB/RB/rb