Article 19: Special Permit Project Review

Ames Street Residences

Cambridge, Massachusetts

Submitted to
Cambridge Community Development Department
City Hall Annex
344 Broadway
Cambridge, MA

Applicant
BP Cambridge Center Residential LLC, an affiliate of Boston Properties
800 Boylston Street, Suite 1900
Boston, MA

Prepared by
VHB *Vanasse Hangen Brustlin, Inc.*
99 High Street 10th Floor
Boston, MA

www.vhb.vom

In association with
FXFOWLE Architects
CBA Landscape Architects LLC
Adams & Rafferty, LLP

August 2014

Transportation
Land Development
Environmental
Services

VHB imagination | innovation | energy Creating results for our clients and benefits for our communities

Vanasse Hangen Brustlin, Inc.

August 8, 2014

Mr. Brian Murphy, Assistant City Manager
Cambridge Community Development Department
344 Broadway
Cambridge, MA 02139

Re: Ames Street Residences, Cambridge, MA
Article 19: Special Permit Project Review

Dear Mr. Murphy,

We are submitting for your review an application for a Project Review Special Permit in accordance with Article 19, Project Review of the Cambridge Zoning Ordinance for the Ames Street Residences project located at 85 Ames Street set in between 4 and 5 Cambridge Center in Kendall Square (the "Project"). BP Cambridge Center Residential LLC, an affiliate of Boston Properties (the "Applicant"), is proposing to construct a new residential building with up to 280 housing units and related ground floor retail totaling approximately 216,000-gross square foot (216,000 of Gross Floor Area, or GFA). Constructed on a parcel in front of the existing Cambridge Center East Garage, the new residential building will not only bring much needed housing to the neighborhood, helping create a greater sense of community, but will significantly transform Ames Street by creating a new activated pedestrian experience along the street replacing an existing street-facing service/loading area and parking garage entrance.

It should be noted that a portion of the parcel will be purchased from the city at the time permits are obtained. This area is noted as the area of "Discontinued Right of Way" on the proposed plot plan (Figure 1.6).

Enclosed with this letter are fifteen (15) copies of the report along with a CD including an electronic copy of the full Traffic Impact Study, which was certified by the Cambridge Traffic, Parking and Transportation Department on July 7, 2014.

Please do not hesitate to contact me at 617-728-7777 if you have any questions. Thank you for your assistance.

Very truly yours,

VANASSE HANGEN BRUSTLIN, INC.

Mark Junghans, Principal

cc: David Stewart and Ben Lavery, BP Cambridge Center Residential, LLC

99 High Street, 10th Floor
Boston, Massachusetts 02110-2354
617.728.7777 ▪ FAX 617.728.7782
www.vhb.com

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August 2014

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CITY OF CAMBRIDGE, MASSACHUSETTS

PLANNING BOARD

CITY HALL ANNEX, 344 BROADWAY, CAMBRIDGE, MA 02139

SPECIAL PERMIT APPLICATION • COVER SHEET

In accordance with the requirements of the City of Cambridge Zoning Ordinance, the undersigned hereby petitions the Planning Board for one or more Special Permits for the premises indicated below.

Location of Premises: 88 Ames Street

Zoning District: MXD

Applicant Name: BP Cambridge Center Residential LLC

Applicant Address: 800 Boylston Street, Suite 1900, Boston, MA 02199

Contact Information: 617.236.3300 blavery@bostonproperties.com 617.421.1566

Telephone # Email Address Fax #

List all requested special permit(s) (with reference to zoning section numbers) below. *Note that the Applicant is responsible for seeking all necessary special permits for the project. A special permit cannot be granted if it is not specifically requested in the Application.*

Section 19.20 Project Review Special Permit

List all submitted materials (include document titles and volume numbers where applicable) below:

Application Form, Ownership Certificate, Dimensional Form, Project Narrative, Urban Design Narrative, Sewer Service Infrastructure Narrative, Water Service Infrastructure Narrative, Noise Mitigation Narrative, LEED Narrative, Tree Study, Traffic Study Summary (submitted separately to Cambridge, Traffic, Parking and Transportation Department), Site Plan, Elevations, Sections, Perspective Renderings, Floor Plans, Elevations.

Signature of Applicant: David Stewart, VP - Development

For the Planning Board, this application has been received by the Community Development Department (CDD) on the date specified below:

Date Signature of CDD Staff

OWNERSHIP CERTIFICATE

Project Address: 88 Ames Street **Application Date:** 08/08/14

This form is to be completed by the property owner, signed, and submitted with the Special Permit Application:

I hereby authorize the following Applicant: BP Cambridge Center Residential LLC

at the following address: 800 Boylston Street, Suite 1900, Boston, MA 02199

to apply for a special permit for: Ames Street Residences

on premises located at: 88 Ames Street

for which the record title stands in the name of: See explanation of current ownership of parcels as addressed

whose address is: in the cover letter and Section 1 of the enclosed report.

by a deed duly recorded in the:

Registry of Deeds of County: _____ Book: _____ Page: _____

OR Registry District of the Land Court, Certificate No.: _____ Book: _____ Page: _____

_____

Signature of Land Owner (If authorized Trustee, Officer or Agent, so identify)

To be completed by Notary Public:

Commonwealth of Massachusetts, County of _____

The above named _____ personally appeared before me,

on the month, day and year _____ and made oath that the above statement is true.

Notary: _____

My Commission expires: _____

FEE SCHEDULE

Project Address: 88 Ames Street **Application Date:** 08/08/14

The Applicant must provide the full fee (by check or money order) with the Special Permit Application. Depending on the nature of the proposed project and the types of Special Permit being sought, the required fee is the larger of the following amounts:

- If the proposed project includes the creation of new or substantially rehabilitated floor area, or a change of use subject to Section 19.20, the fee is ten cents ($0.10) per square foot of total proposed Gross Floor Area.
- If a Flood Plain Special Permit is being sought as part of the Application, the fee is one thousand dollars ($1,000.00), unless the amount determined above is greater.
- In any case, the minimum fee is one hundred fifty dollars ($150.00).

Fee Calculation

New or Substantially Rehabilitated Gross Floor Area (SF): 200,000	× $0.10 =	$20,000
Flood Plain Special Permit	Enter $1,000.00 if applicable:	NA
Other Special Permit	Enter $150.00 if no other fee is applicable:	NA
TOTAL SPECIAL PERMIT FEE	**Enter Larger of the Above Amounts:**	$20,000

DIMENSIONAL FORM

Project Address: 88 Ames Street **Application Date:** 08/08/14

	Existing	Allowed or Required (max/min)	Proposed	Permitted
Lot Area (sq ft)	16,542	NA	16,542	
Lot Width (ft)	206'-4"	NA	206'-4"	
Total Gross Floor Area (sq ft)	216,000	216,000	216,000	
Residential Base	NA	200,000	200,000	
Non-Residential Base	NA	16,000	16,000	
Inclusionary Housing Bonus	NA	per zoning	None	
Total Floor Area Ratio	NA	NA	13.06	
Residential Base	NA	NA	NA	
Non-Residential Base	NA	NA	NA	
Inclusionary Housing Bonus	NA	NA	NA	
Total Dwelling Units	0	280	280	
Base Units	NA	NA	280	
Inclusionary Bonus Units	NA	NA	None	
Base Lot Area / Unit (sq ft)	NA	NA	59.08 sf/unit	
Total Lot Area / Unit (sq ft)	NA	NA	59.08 sf/unit	
Building Height(s) (ft)	0	250'	250'	
Front Yard Setback (ft)	0	0	0	
Side Yard Setback (ft)	0	0	0	
Side Yard Setback (ft)	0	0	0	
Rear Yard Setback (ft)	0	0	0	
Open Space (% of Lot Area)	NA	NA	NA	
Private Open Space	NA	NA	NA	
Permeable Open Space	NA	NA	NA	
Other Open Space (Specify)	NA	NA	NA	
Off-Street Parking Spaces	NA	140	140	
Long-Term Bicycle Parking	NA	NA	296	
Short-Term Bicycle Parking	NA	NA	38	
Loading Bays	NA	NA	4	

Use space below and/or attached pages for additional notes:

1
Project Description

1.1 Introduction

This is an application for a Project Review Special Permit for the Ames Street Residences project—a new residential building at 88 Ames Street in the Kendall Square area of Cambridge (the "Project"). BP Cambridge Center Residential LLC, an affiliate of Boston Properties (the "Applicant"), is proposing to construct up to 280 housing units with related ground floor retail in an approximately 216,000-gross square foot (216,000 of Gross Floor Area, or GFA) building to be established as an integral part of Cambridge Center redevelopment. The Project is located at 88 Ames Street on the south side of Ames Street across from the recently constructed Broad Institute Expansion at 75 Ames Street set in between 4 and 5 Cambridge Center (the "Project Site"). Refer to Figure 1.1 for a site location map and Figure 1.2 for site context.

The Project marks a new phase in the Cambridge Center development. The building will not only bring much needed residential units to the neighborhood, helping create a greater sense of community, but will significantly transform Ames Street by creating a new activated pedestrian experience along the street replacing an existing street-facing service/loading area and parking garage entrance. The existing parking garage will be reduced by one bay and 22 floors of new residential units will be constructed on a parcel in front of the Cambridge Center East Garage (the "East Garage") with a portion of the Project extending into the existing garage footprint. The building has been designed to accommodate up to 16,000 square feet of retail space to continue the activation of the streetscape along Ames Street. Approximately 7,000 square feet would be at ground floor with additional space possible at the lower level or second floor.

As demonstrated herein, the Project as submitted conforms to the Citywide Urban Design Objectives of Article 19.30 (as discussed in Section 4), the Sustainable Design and Development requirements of Article 22.23 (as discussed in Section 6), and satisfies all other requirements necessary for the issuance of the requested Project Review Special Permit.

■

1.1.1 Project Background and Consistency

The Project is located within the Ames Street District (ASD), a sub district of the Mixed Use Development (MXD) District in Kendall Square. Residential uses have long been supported by the City, and included in the Cambridge Center Master Plan, and by the Planning Board through authorization in the Eastern Cambridge rezoning of 2001, and was later reaffirmed in the Applicant's MXD rezoning of 2010, which included a requirement for Special Permit Review with an emphasis on urban design and transportation. This 2010 rezoning authorized the Broad Institute expansion while including a commitment to begin the development of housing within a certain timeframe or pay a monetary penalty to the City. The Project fulfills this commitment. The 2013 rezoning of the ASD was intended to advance the development of a residential building in that district.

1.2 Existing Site Conditions

Figure 1.3 shows the existing conditions site plan presents photographs of existing site conditions. The Project Site is composed of parcels currently owned by the Applicant adjacent to the existing 4 Cambridge Center, 5 Cambridge Center, and East Garage sites as well as an area of land that is currently a part of Ames Street. This land be deeded to the Applicant by the City of Cambridge pursuant to a Land Disposition Agreement dated February 6, 2014 by and between the City and Applicant.

The East Garage was constructed in 1982 as part of the Cambridge Center Master Plan to accommodate parking needs for multiple facilities constructed within the district (as contemplated by the zoning ordinance), as well as to accommodate other area parking needs. The East Garage's existing parking capacity is 844 spaces, which are used primarily by monthly tenant parking, but includes transient and visitor parking.

The remainder of the Project Site consists of an existing service area apron and garage entrance driveway located along the Ames Street frontage.

1.3 Proposed Site Conditions

The Project includes construction of an up to 280 residential units and related amenities and ground floor retail space in an approximately 216,000-gross square foot (216,000 GFA) building. Figure 1.5 presents the proposed site plan. A portion of the parcel will be purchased from the city at the time permits are obtained. This area is noted as the area of "Discontinued Right of Way" on the proposed plot plan shown in Figure 1.6. Table 1-1 presents the proposed development program.

Table 1-1
Proposed Development Program

Use	Size/Quantity
Residential	200,000 GSF[1] 280 units[2]
Retail	16,000 GSF[3]
Total SF	216,000 GSF
Parking	140 spaces[4]

1 Represents maximum build scenario; an approx. 250-foot high building.
2 36 units to be affordable distributed throughout building in full compliance with the Ordinance.
3 Assumes 2-story retail.
4 Assumes 0.5 spaces/unit, as required by zoning; existing garage will provide adequate capacity post-reconfiguration.

The building has been designed to include ground-floor retail/restaurant space to continue the activation of the streetscape along Ames Street recently bolstered by the completion of the Broad Institute Expansion across the street. This development is coordinated with the realignment of Ames Street intended to better match the street dimension to its utilization and provide a more pedestrian friendly street scale and function.

No expansion of the East Garage parking capacity is required to accommodate the parking needs of the Project. The East Garage will be reconfigured to accommodate the new building resulting in a reduction of approximately 40 actual parking spaces for a total of 804 spaces. However, the garage may be operated on a managed parking basis in order to maintain its 844 vehicle parking capacity. The East Garage capacity will adequately serve the resident parking required (0.50 spaces per unit, per the ASD, or 140 spaces). As discussed further in Section 2, *Transportation and Parking*, vehicular access to the East Garage will be modified to support the Project. The existing west entrance/exit point on Ames Street and adjacent loading dock will both be eliminated and all automobile access to the East Garage will be accommodated from the existing entrance on Broadway. Egress will be provided via the existing Broadway exit and supported with a new additional egress-only drive for non-transient users that would connect the garage back to Ames Street just north of 5 Cambridge Center. (Refer to Figure 2.2 for an illustration of the proposed vehicular access to the East Garage.) Pedestrian access will be enhanced, including a new ground level access through the East Garage from Broadway. Refer to Section 1.3.2.3 below for further details regarding site access.

Figure 1.7 presents the proposed panel notification location during construction.

■

1.3.1 Architectural Design

1.3.1.1 Height & Massing

Given the Project's location in a dense urban fabric, great consideration was given to how it relates to both the neighboring buildings and the street. The building massing has been carefully shaped to fit within the tight constraints of the Project Site, which is limited to the north by 4 Cambridge Center, to the south by 5 Cambridge Center, and to the east by the Google Connector building. The proposed design aims to minimize impact to the adjacent office buildings while maximizing access to light and views for the residential units. The building massing is further articulated by defining three distinct volumes that engage the city at three different scales. The building bulk is separated in to base and tower by a one-story reveal at the 4th floor. This allows the building be at a more pedestrian-friendly scale as it engages the street. The base is further articulated by a two-story retail/residential zone as well as by a 16-foot wide by 5-foot deep reveal that runs the whole height of the base and marks the entrance to the residential lobby. Above the base is the main tower volume, which faces Ames Street and is the most visible element in the building at the neighborhood scale. The proportions of the volume were carefully designed to reduce the amount of frontage on Ames Street, letting in more light to hit the street and minimizing the amount of surface that faces the buildings across the street. The third volume, which incorporates the mechanical bulkhead, is set back from the street to reduce the impact of the building height on the pedestrian space. This taller element is also the most visible element from around the city and, as such, becomes an important part of how the Project engages the Cambridge skyline. Refer to Figures 1.8a-g for building floor plans, Figure 1.9 for a building section, and Figures 1.10a-d for building elevations.

1.3.1.2 Exterior Building Materials

Figures 1.11a-f present project renderings from various views surrounding the Project Site. The building exterior design continues the idea of contextual response that informed the massing. The façade of the residential tower is made up horizontal strip windows and precast spandrels that are interrupted by vertical precast concrete piers. These piers vary in spacing to create smaller openings where the building is facing another building and larger openings where there are more access to light and views. This strategy focuses transparency in the areas that are more open to views and create more discrete openings at places where the other buildings would be looking in to the residential units. As the building rises above neighboring buildings, the façade system to openings become larger to take advantage of the views of the river and esplanade. The façade articulation also responds directly to the urban context by providing a termination to the main sight lines along Ames Street and from different key vantage points from around Kendall Square. This play between the aluminum windows and precast concrete piers create a dynamic façade that both conveys the dynamic nature of the

neighborhood and creates a totally unique design that is a direct response to the site constraints.

1.3.1.3 Shadows

The Applicant has completed a shadow study as part of this application to ascertain the potential new shadow impacts resulting from the Project. The shadow impact study has been conducted in accordance with Article 19.33 (6):

> *"The structure is designed and sited to minimize shadow impacts on neighboring lots, especially shadows that would have a significant impact on the use and enjoyment of adjacent open space."*

Figures 1.12a-c present the estimated net new shadow as a result of the Project (shown in blue) for the times of 9:00AM, 12:00PM, and 3:00PM during the Summer and Winter Solstices, and Spring/Fall Equinox. Based on the shadow studies, the Project is not expected to result in significant new shadow on surrounding public open space.

Summer Solstice (June 21)

Figure 1.12a depicts the estimated net new shadow cast by the Project on the Summer Solstice (June 21). June 21 is the summer solstice with the longest day of the year and the smallest shadows expected. The Project is not projected to cast new shadows on adjacent public open space at 9:00AM or 12:00PM as new shadow will fall on Ames Street. At 3:00 PM, the Project is projected to cast new shadow to the northeast on a portion of the adjacent Google Connector building rooftop and a small sliver of shadow would fall on the public rooftop garden just east of the Google Connector.

Equinox (March 21 & September 21)

March 21 and September 21 are the Spring and Fall Equinoxes, respectively on which Cambridge experiences roughly equal length day and night. The No-Build and Build Condition shadows for this condition are depicted on Figure 1.12b. The Project is not projected to cast new shadows on adjacent public open space during any of the times analyzed for the Equinox. At 9:00AM and 12:00PM, new shadow will fall on Ames Street and building rooftops across Ames Street. At 3:00 PM, the Project is projected to cast new shadow over the rooftop of the adjacent 5 Cambridge Center building.

Winter Solstice (December 21)

The No-Build and Build Condition shadows for this condition are depicted on Figure 1.12c. December 21 is the winter solstice and the shortest day of the year and, therefore, Cambridge experiences long shadows throughout the day in most locations. The Project is not projected to cast new shadows on adjacent public open space during any of the times analyzed on December 21. At 9:00 AM, the sun is low in the southeast sky resulting in long shadows to

the northwest. At this time, the Project will create new shadow over building rooftops across Ames Street. At 12:00 PM, the Project is projected to cast shadows north down Ames Street. At 3:00 PM, the Project is projected to cast new shadow over the rooftop of the adjacent 5 Cambridge Center building. The sun sets on December 21 at approximately 4:15 PM EST.

1.3.1.4 Wind

Figures 1.13a-b present the future pedestrian wind conditions. Predicted changes in wind conditions around the Project are discussed in detail in Attachment 1. Under existing conditions along Ames Street, pedestrian wind conditions are comfortable for standing or strolling during the summer and comfortable for strolling or walking during the winter. The pedestrian wind study demonstrates that as a result of the Project all at-grade and lower podium level locations are predicted to pass the criterion used to assess pedestrian wind safety and appropriate wind comfort conditions are expected throughout the year along sidewalks surrounding the Project. In the summer, conditions are expected to be comfortable for strolling during the summer (Figure 1.13a) and comfortable for walking during the winter (Figure 1.13b). These conditions are suitable for the intended pedestrian usage of the area.

Future wind conditions on the existing rooftop garden to the east of the proposed building are projected to be comfortable for strolling and walking during both the summer and winter.

■

1.3.2 Site Planning and Landscape Design

The proposed site design incorporates five distinct areas within a cohesive open space plan to encourage a vibrant and varied pedestrian experience. These areas include:

- The Streetscape, located outside the Project's property line inclusive of curbs, street trees, streetlights, planting beds and public sidewalk, which benefit the pedestrian and maximize comfort;
- The Outdoor Seating Area/Open Space located to the south of Ames Street in the frontage of Legal Sea Foods, which is shown with a mix of private and public open space;
- Pioneer Way, an open space corridor/shared use passageway with programmed elements of a pedestrian nature;
- The Outdoor Seating Area/Open Space, a mix of private and public open space fronting Meadhall restaurant at the north end of Ames Street; and
- Rooftop (non-street level) Open Space design located to the north end of Ames Street, to be determined, to serve the residential component of the Project.

Refer to Figure 1.14 for the locations of these spaces. The following sections describe the proposed improvements associated with these areas.

1.3.2.2 Streetscape and Public Space Improvements

Enhancing and promoting sustainable transportation is an important objective for the City of Cambridge and changes to Ames Street support Cambridge's policies to promote improved pedestrian and bicycle infrastructure within the City. In conjunction with the Project, the City of Cambridge will be reconfiguring Ames Street by reducing the pavement width of Ames Street while reinforcing bicycle and pedestrian accommodations. As currently planned, the existing 4-lane Ames Street would be reconfigured to support implementation of dedicated bicycle infrastructure along the corridor between Main Street and Broadway. Current plans being advanced by the City of Cambridge call for a buffered 2-way cycle track along the east side of Ames Street with on-street parking separating bicycle travel from vehicle travel. The proposed Ames Street geometric reconfiguration and streetscape improvement options are shown in Figure 1.15 and are described more fully in Section 2, *Transportation and Parking*.

As a result of the disposition of a 20-foot-wide parcel of land along the eastern edge of Ames Street between Broadway and Main Street, the road edge (which is currently used as a sidewalk) will be modified in a way to provide for significant streetscape and public space improvements. This includes new street tree plantings, spaced 30 feet on center, which bolster the urban canopy cover and provide shade to pedestrians and bicyclists along the corridor. The alternate option of larger planting beds along the road edge (Option A as shown in Figure 1.15) is designed to provide more planted material to soften the streetscape and potentially improve downstream water quality by filtering stormwater flows from the surrounding development through a series of flow-through planters. Additionally, new street lighting fixtures, frequently placed bicycle storage racks, and contemporary yet comfortable street furniture will make the street a more comfortable place to linger, shop, and dine.

1.3.2.3 Pedestrian Circulation

As part of the City's proposed improvements to Ames Street, the pedestrian sidewalk along the east side of Ames Street would be widened considerably, from its current width of 11-14 feet to approximately 15.5 feet. Roadway width changes would also require adjustments to sidewalks, accessible ramps, and traffic signalization at the intersections of Ames Street/Main Street and Ames Street/Broadway. Figure 1.16 illustrates the proposed pedestrian circulation through and around the Project Site as well as to adjacent buildings.

Permeability

The Project Site is well connected to existing pedestrian sidewalks along surrounding streets providing access to the proposed development. Pedestrian facilities within the Project Site will be designed to meet appropriate safety and accessibility standards. The alleyway between 5 Cambridge Center and the East Garage, to be re-named Pioneer Way, will accommodate pedestrians and provide a cut-through to Main Street. Pedestrians traveling from Broadway will also be able to circulate through the East Garage to access 5 Cambridge Center, the Marriot Hotel's lobby, and Main Street as well as MBTA Kendall/MIT along a signed shared

use zone (Figure 1.16). At the entry point and inside the garage, overhead lighting will be paired with signage and pavement markings to provide the visual cues necessary for visitors to find their way and for drivers to use caution while sharing the path of travel with pedestrians.

Pioneer Way Design/Treatment

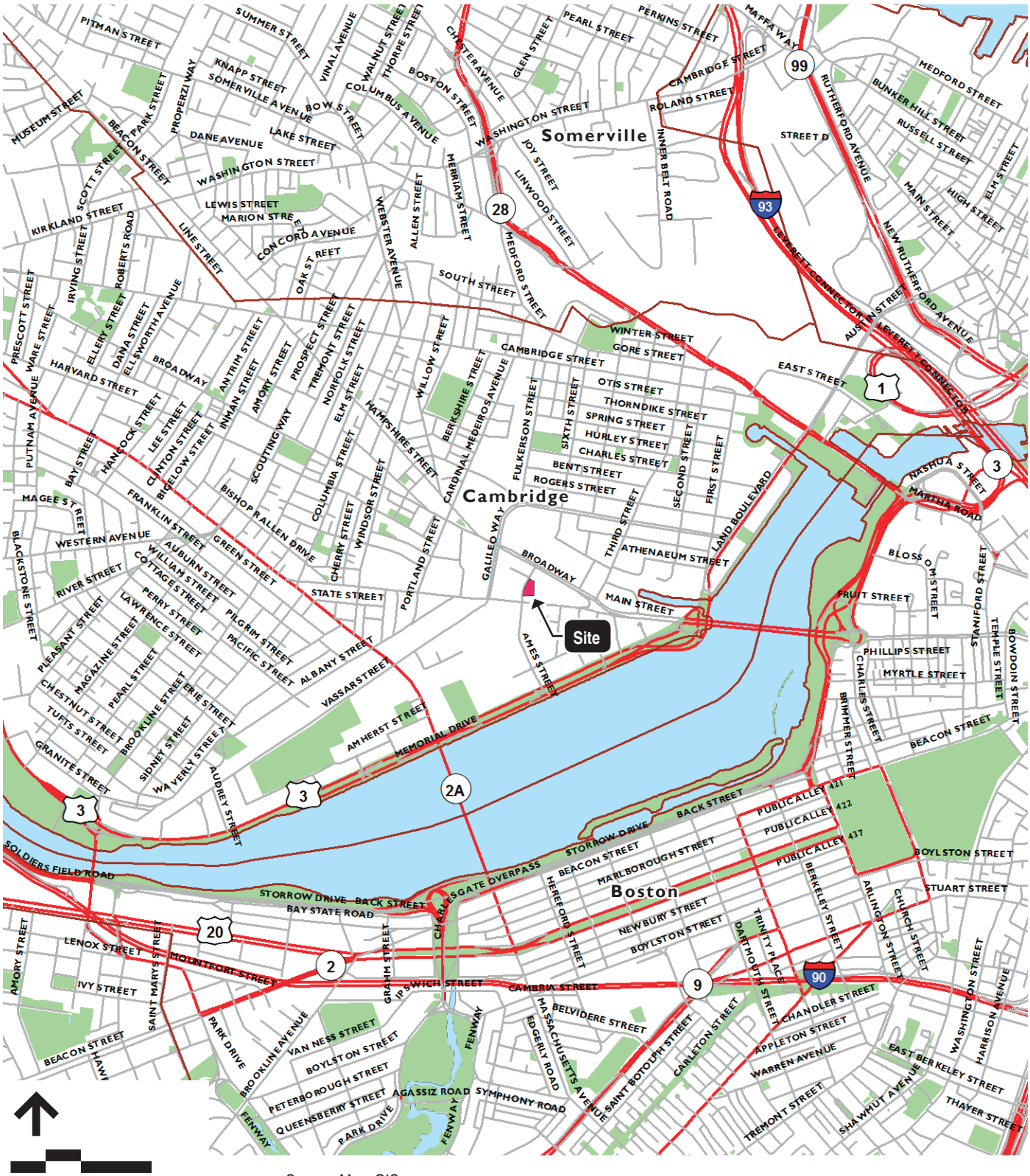
The proposed building will be flanked by two new open spaces that will complete the transformation of Ames Street into a pedestrian-friendly link between Kendall Square and East Cambridge and a vibrant addition to the neighborhood. Pioneer Way, which connects Ames Street to the rest of Cambridge Center, will be re-envisioned as a shared access way where pedestrians, bicycles, and vehicles co-exist in a controlled, safe environment. The existing East Garage loading dock and entrance will be relocated to Pioneer Way and will be used as exit only for monthly pass holders and the loading dock use will be controlled and managed by the Applicant to operate with minimal impact to pedestrians. Short- and long-term bicycle parking will be provided, as discussed further in Section 2, *Transportation and Parking*.

1.3.2.4 Open Space

Refer to Figure 1.17 for the proposed open space plan. Approximately 15,680 square feet of public open space, in addition to the public sidewalk area, will be created as part of the Project. The programming of the open space, both passive and active, reflects the variety of uses within this dense urban area.

Beginning at the southern end of Ames Street in the frontage currently occupied by Legal Sea Foods, plans provide for an expansion of the outdoor seating area, with planters separating dining patrons from the sidewalk. Moving north, this sidewalk-adjacent pedestrian space opens onto a small pocket park landscaped with low growing, contemporary plantings and the western entry to Pioneer Way—a shared use pedestrian/automotive passageway fronted with retail establishments, restaurants, and back-of-the house activities. Proposals for Pioneer Way include conceptual recommendations for overhead lighting fixtures, lighted bollards, decorative pavement, raised planters, short- and long-term bicycle parking, and seating to help create a sense of pedestrian scale throughout this heavily-traveled throughway to the garage, public roof garden, and Main Street to the southeast.

Further north of the new development footprint, the corner of Ames Street and Broadway is depicted as the site of an additional public pocket park, with a shade-tolerant landscape of low growing woodland plantings, statement benches, light fixtures and paving, which reflect the current of innovation in Kendall Square. Additionally, wrapping the corner of Broadway, the plans accommodate outdoor seating for Meadhall restaurant, to be separated from this park space by simple chains or ropes to adhere with local regulations on outdoor dining.



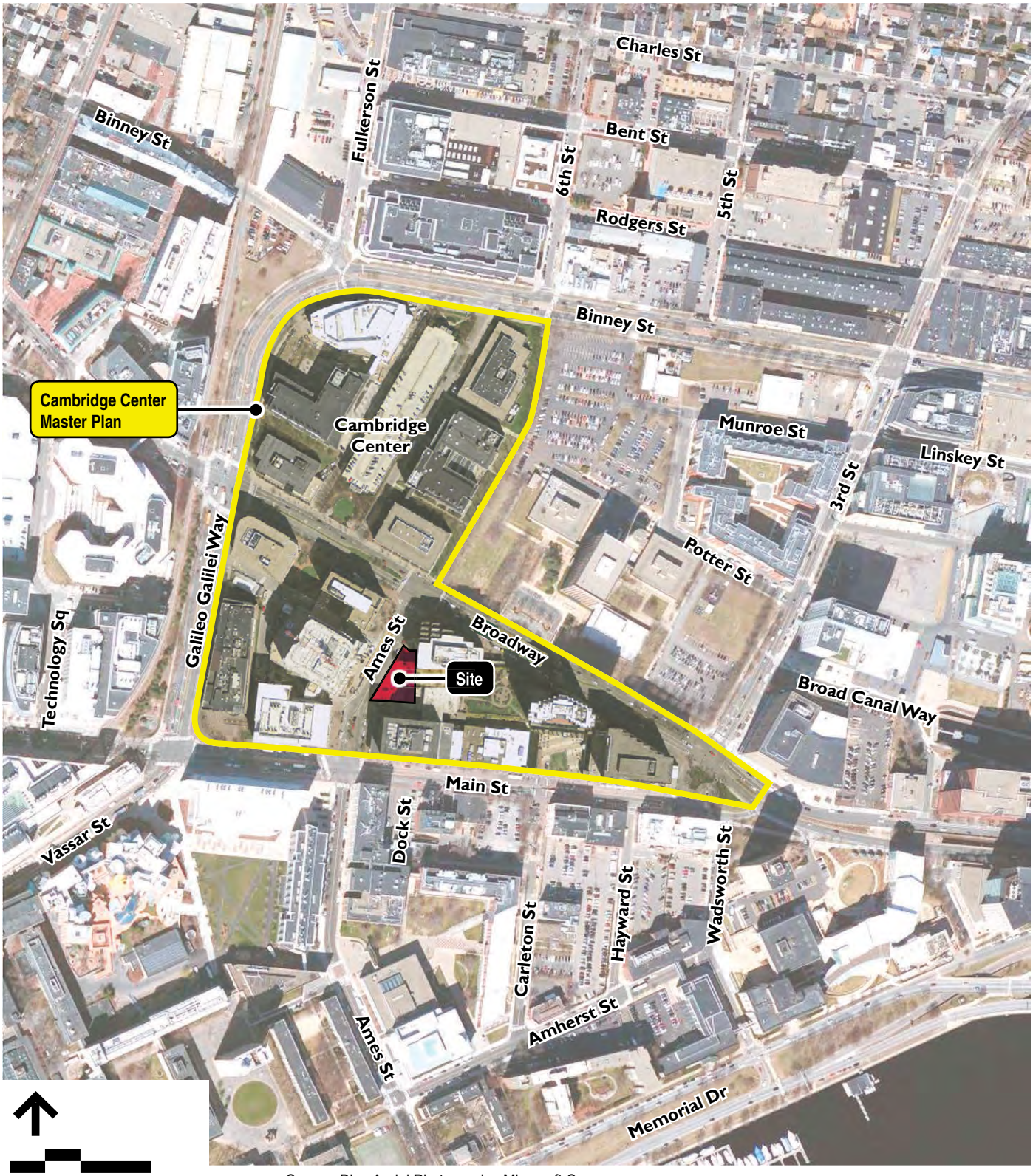
Source: MassGIS

Vanasse Hangen Brustlin, Inc.

Site Location Map

Figure 1.1

Ames Street Residences
Cambridge, MA



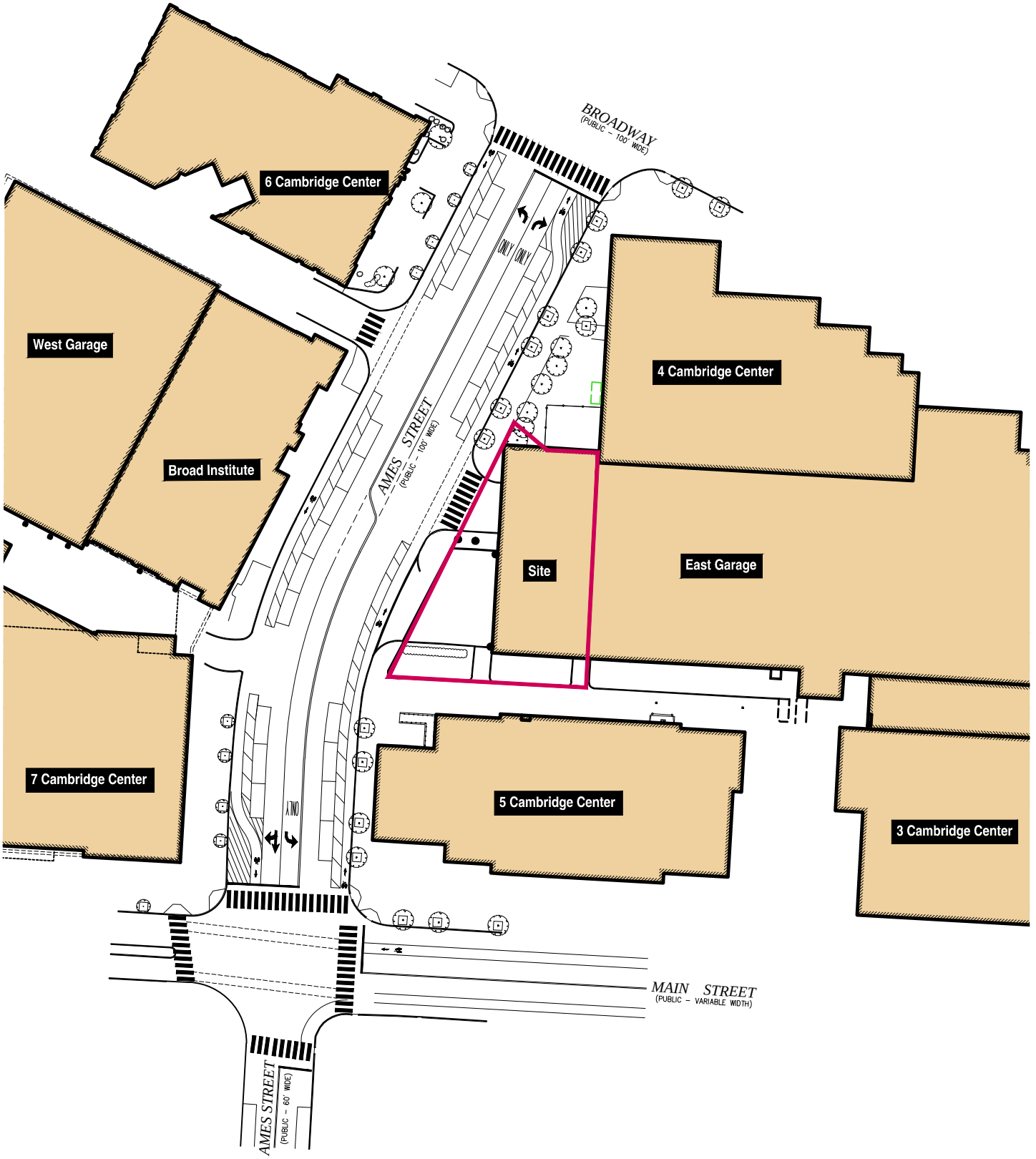
Source: Bing Aerial Photography, Microsoft Corp.

Vanasse Hangen Brustlin, Inc.

Site Context

Figure 1.2

Ames Street Residences
Cambridge, MA



Srouce: B, Inc.

Vanasse Hangen Brustlin, Inc.

Existing Conditions Site Plan Figure 1.3

Ames Street Residences
Cambridge, MA

0 40 80 Feet

1. View across Ames Street

2. View from Marriott

3. View Notrh on Ames Street

Vanasse Hangen Brustlin, Inc.

Figure 1.4
Existing Site Photographs

Ames Street Residences
Cambridge, Massachusets

0 40 80 Feet

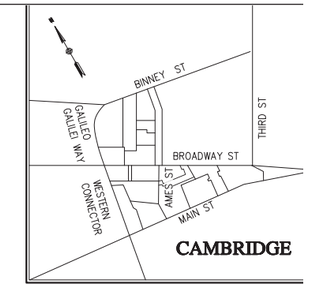
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

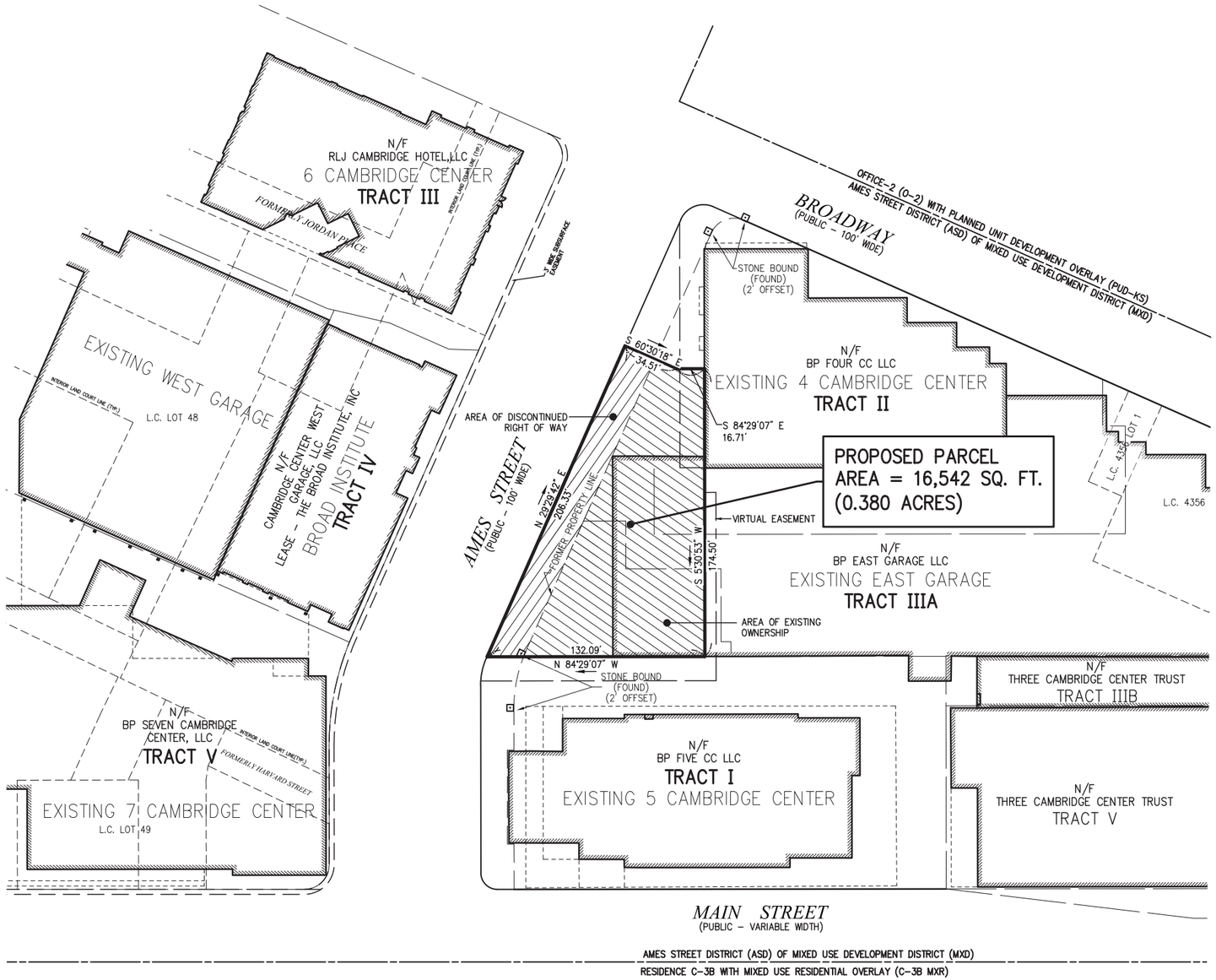
Proposed Development Plan

Figure 1.5

Ames Street Residences
Cambridge, Massachusets



Locus Map
(NOT TO SCALE)



Plan References

1) L.C.C. 30711 A–L
2) L.C.C. 4356 A–C
3) PLAN 298 OF 1977
4) PLAN 621 OF 1980
5) PLAN 1407 OF 1981
6) PLAN 1463 OF 1983
7) PLAN 1334 OF 1986 (4 SHEETS)
8) PLAN 155 OF 1986 (11 SHEETS)
9) PLAN 1316 OF 1987
10) PLAN 1183 OF 1997
11) PLANS 262 OF 1998
12) PLANS 435 OF 2005
13) PLAN 452 OF 2010

General Notes

1) THE PROPERTY LINES SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL FIELD SURVEY CONDUCTED BY VANASSE HANGEN BRUSTLIN, INC. IN OCTOBER, 2012 AND FROM DEEDS AND PLANS OF RECORD.
2) THE EXISTING CONDITIONS SHOWN ON THIS PLAN ARE BASED UPON AN ACTUAL ON–THE–GROUND INSTRUMENT SURVEY PERFORMED BY VANASSE HANGEN BRUSTLIN, INC. IN OCTOBER, 2012.
3) LOCATIONS OF 4 & 5 CAMBRIDGE CENTER AND CAMBRIDGE CENTER EAST GARAGE SUBSURFACE CONCRETE FOUNDATION TAKEN FROM ELECTRONIC FILE (S–361–43A–EXCOND–EMAIL–2012–06–22.DWG) SUPPLIED BY BOSTON PROPERTIES IN JUNE 2012.
4) HORIZONTAL DATUM IS BASED ON PLAN 621 OF 1980.
5) THE PURPOSE OF THE PLAN IS TO SHOW THE LIMITS OF THE PROPOSED AMES STREET RESIDENTIAL PARCEL.

0 20 40 Feet

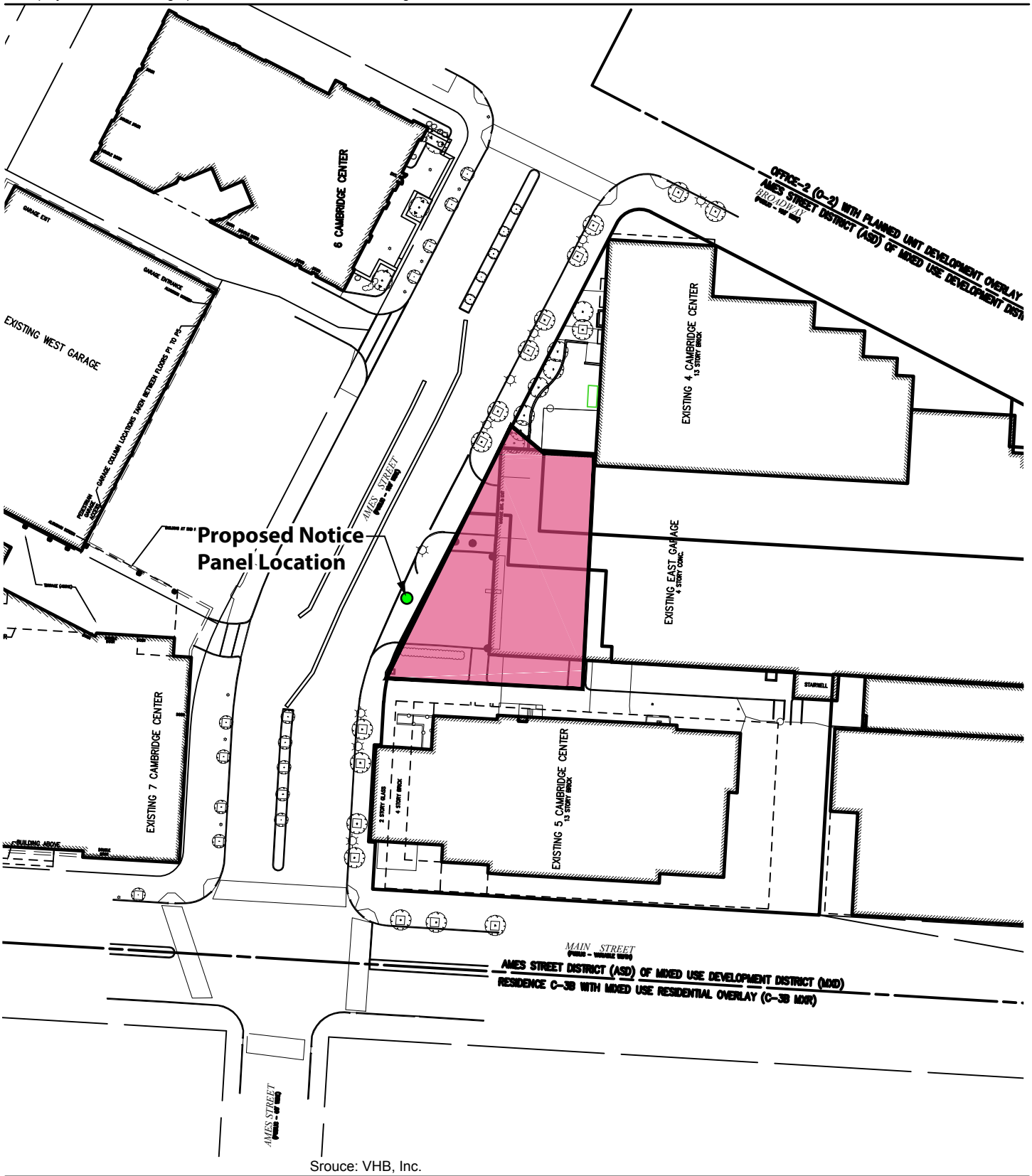
Vanasse Hangen Brustlin, Inc.

Figure 1.6

Preliminary Plot Plan

Ames Street Residences
Cambridge, Massachusetts

\\vhb\proj\Boston\12168.00\graphics\FIGURES\TIS-EX Site Plan.dwg



Srouce: VHB, Inc.

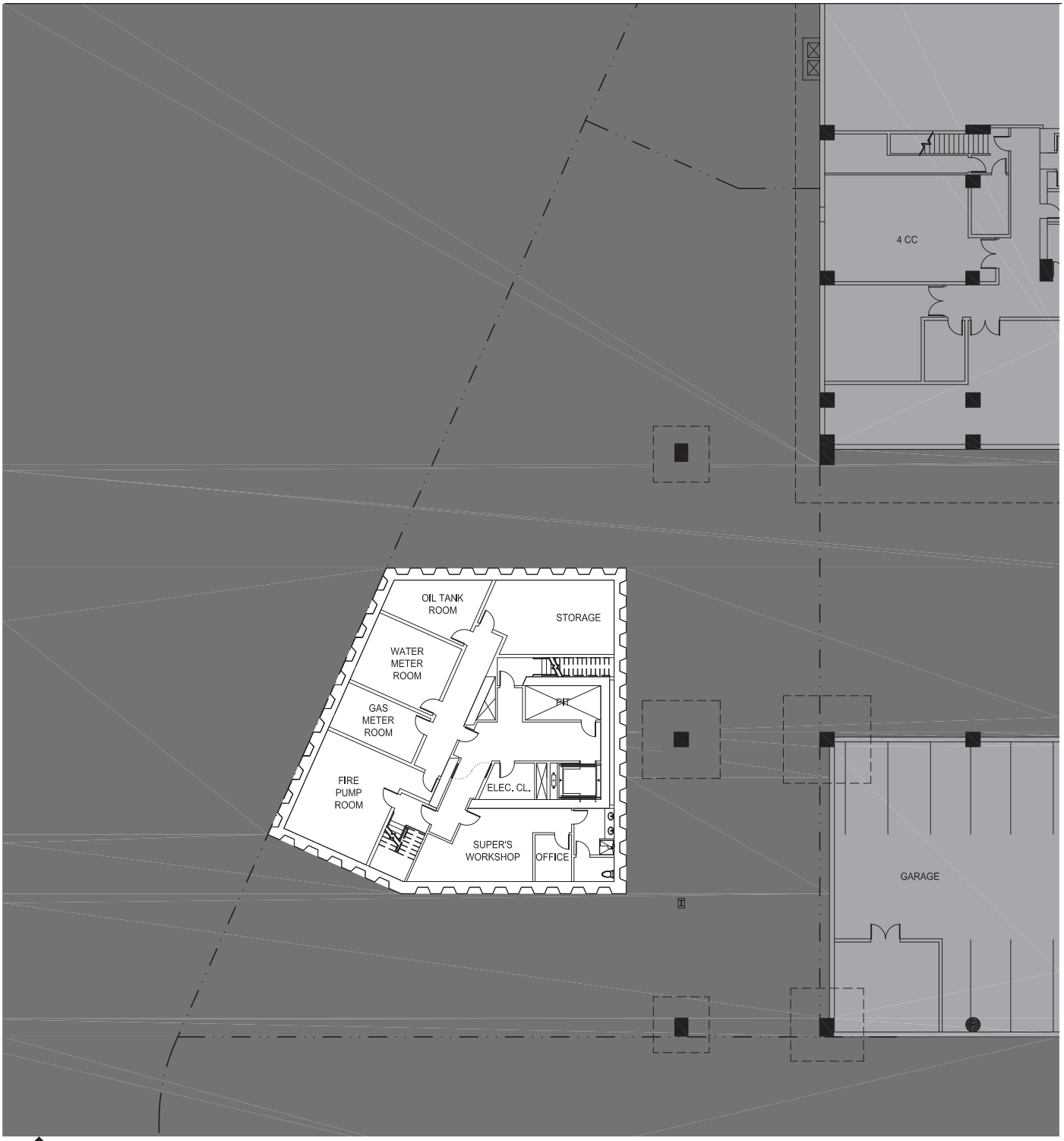
Vanasse Hangen Brustlin, Inc.

Notice Panel Location

Figure 1.7

Ames Street Residences
Cambridge, MA

0 40 80 Feet



0 15 30 Feet

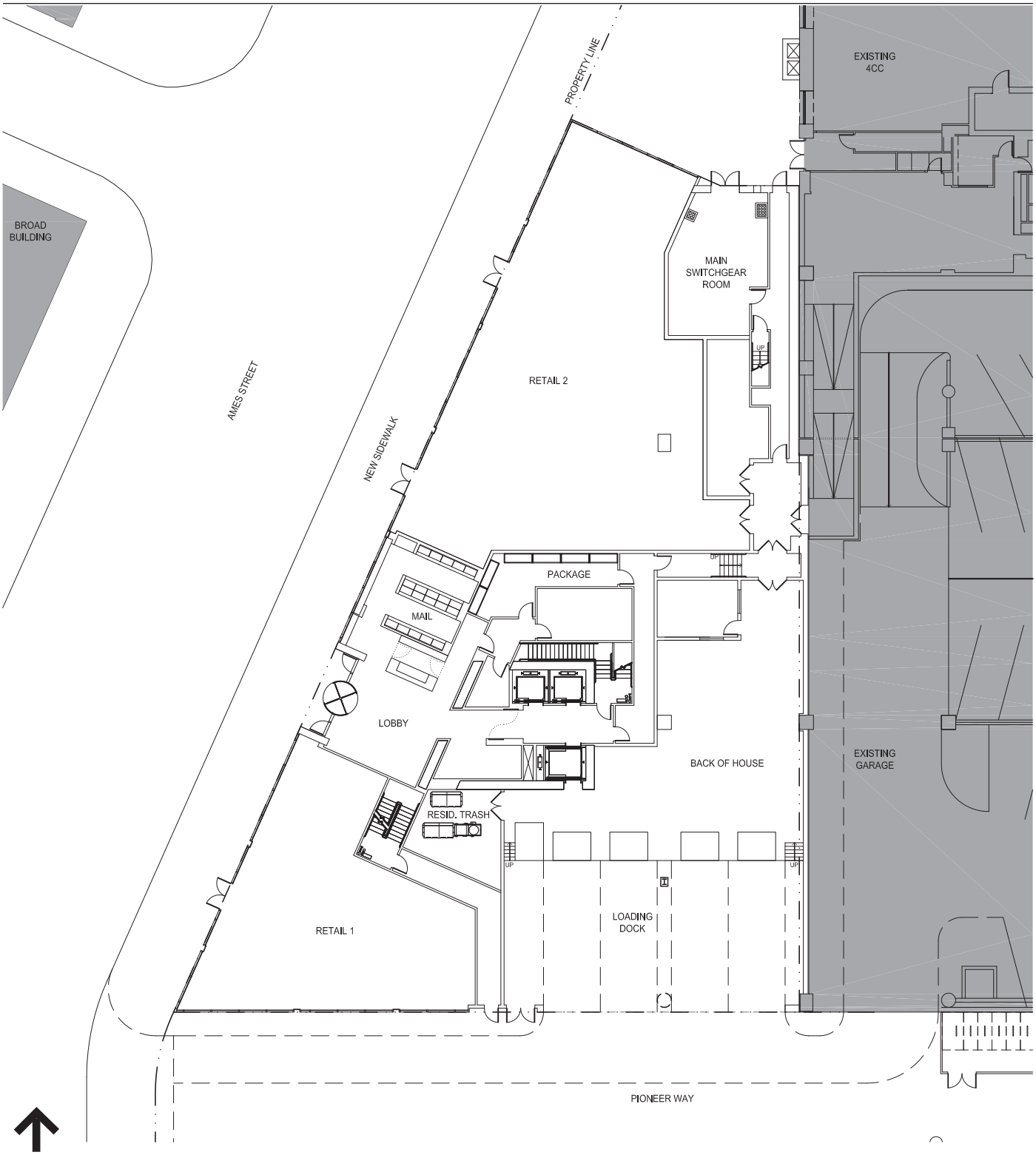
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Cellar Floor Plan

Figure 1.8a

Ames Street Residences
Cambridge, Massachusets



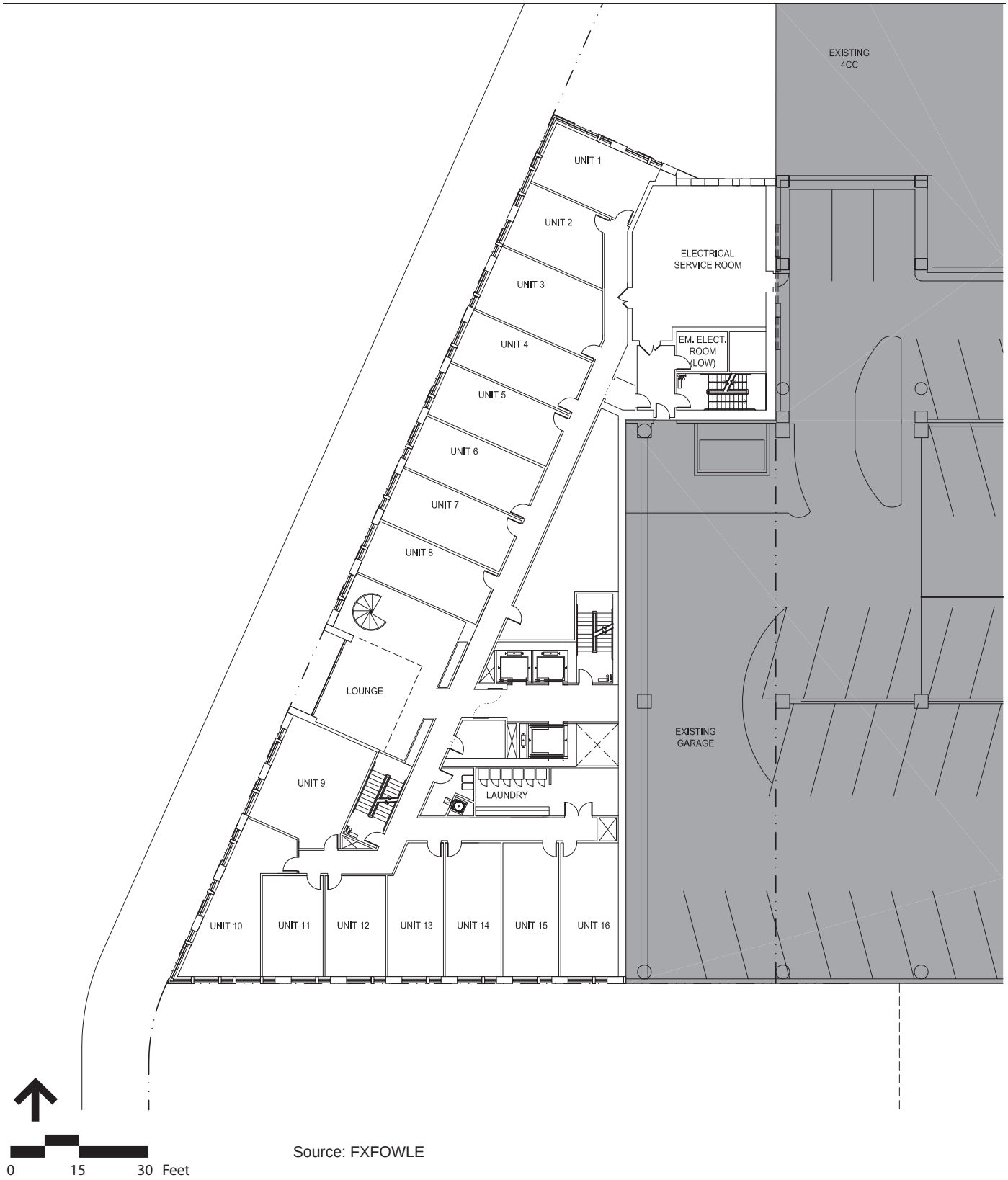
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Ground Floor Plan

Figure 1.8b

Ames Street Residences
Cambridge, Massachusets



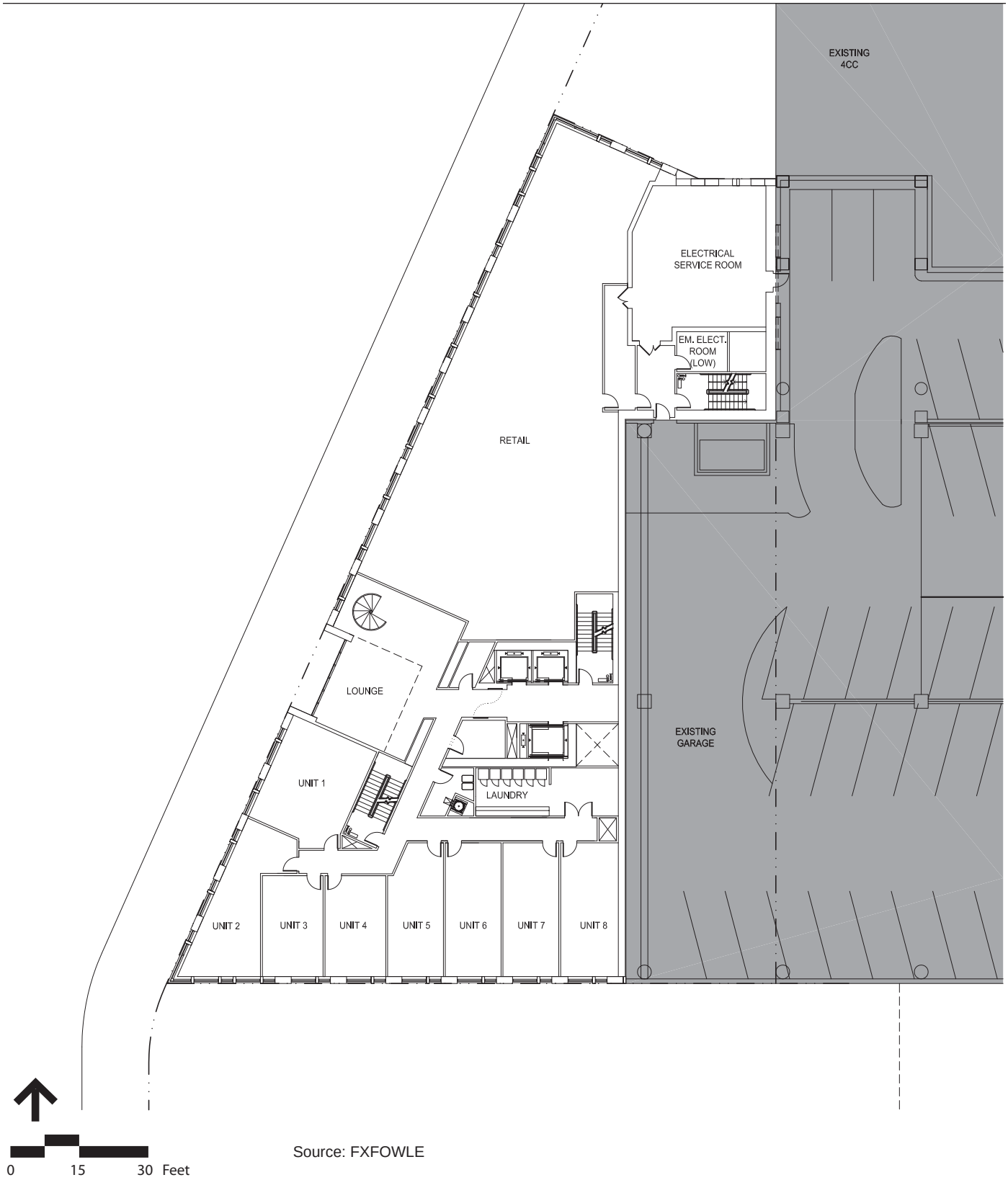
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Second and Third Potential Floor Plan

Figure 1.8c

Ames Street Residences
Cambridge, Massachusets



0 15 30 Feet

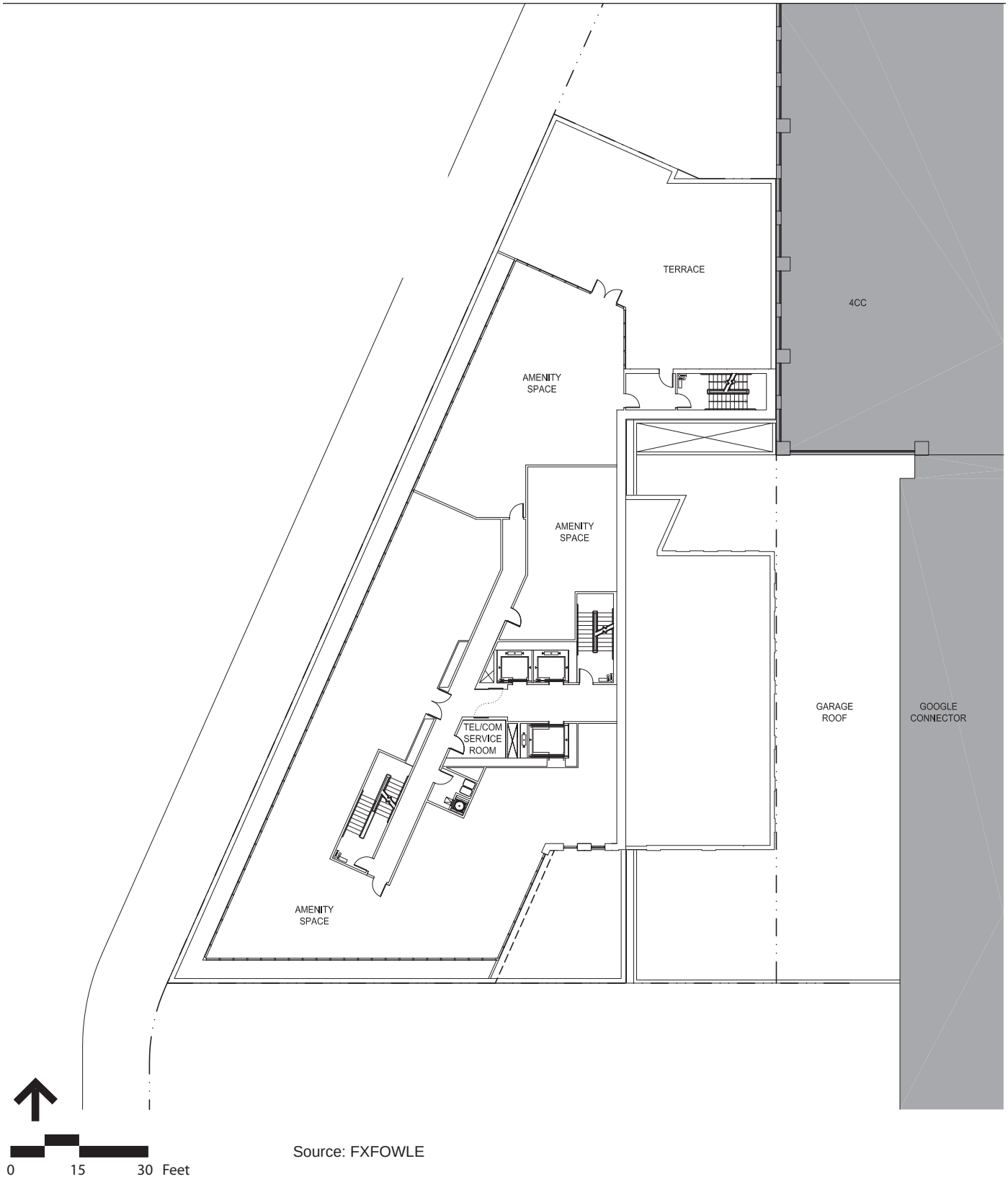
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Second Floor Retail Potential Plan

Figure 1.8d

Ames Street Residences
Cambridge, Massachusets



Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Fourth Floor Plan

Figure 1.8e

Ames Street Residences
Cambridge, Massachusets

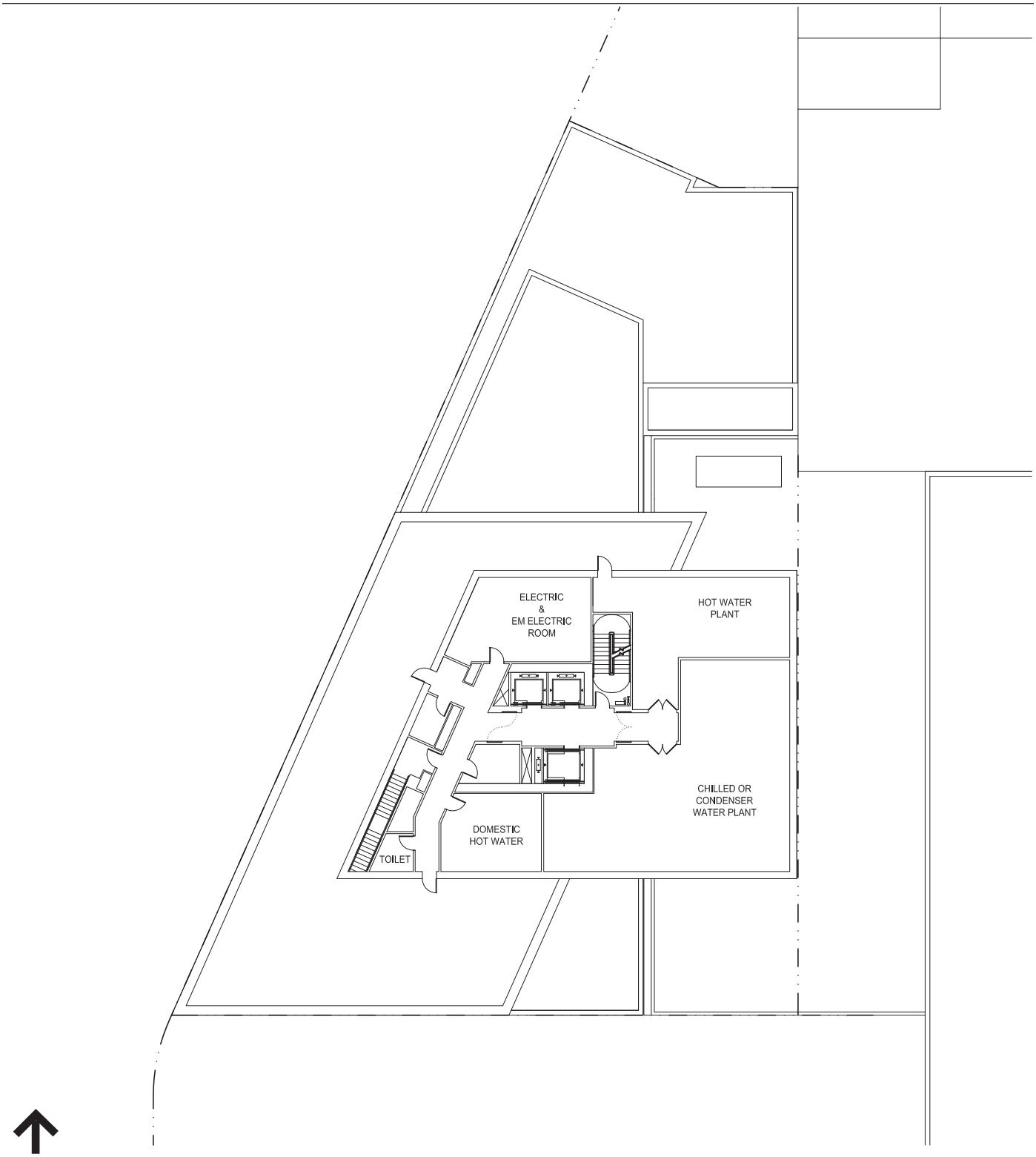
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Potential Tower Floor Plan

Figure 1.8f

Ames Street Residences
Cambridge, Massachusets



0 15 30 Feet

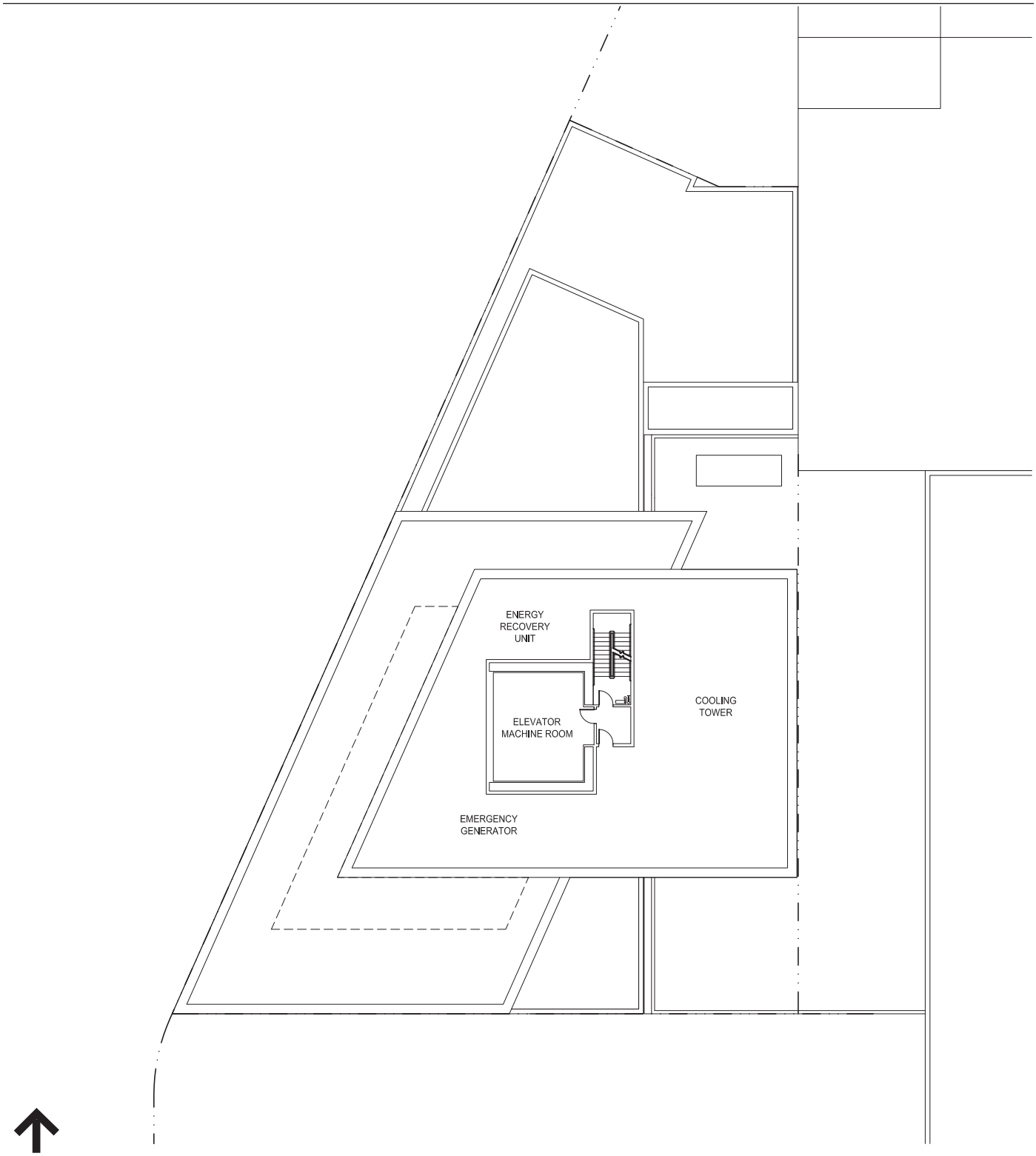
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Roof Terrace Plan

Figure 1.8g

Ames Street Residences
Cambridge, Massachusets



0 15 30 Feet

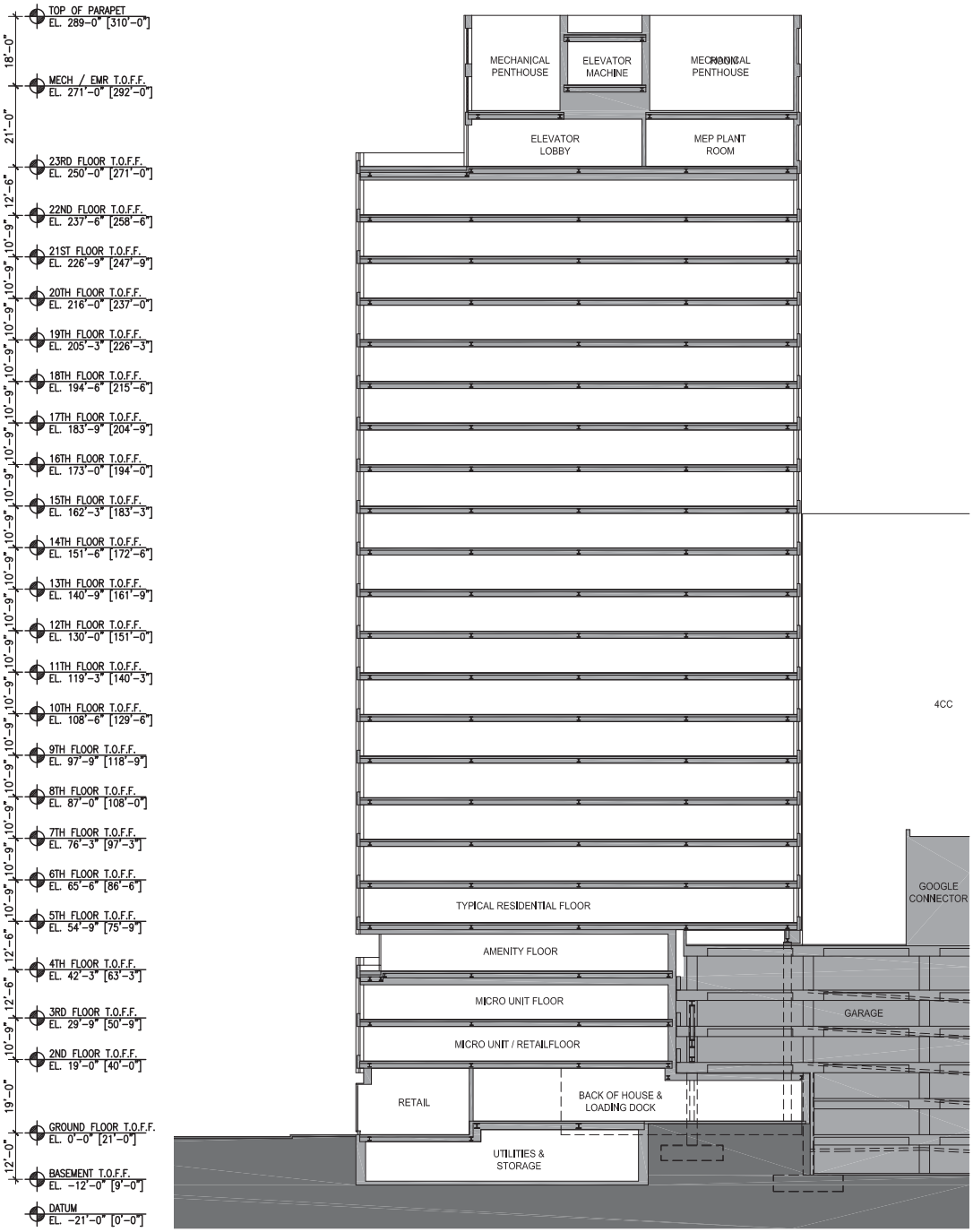
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Mechanical Penthouse Plan

Figure 1.8h

Ames Street Residences
Cambridge, Massachusets



0 20 40 Feet

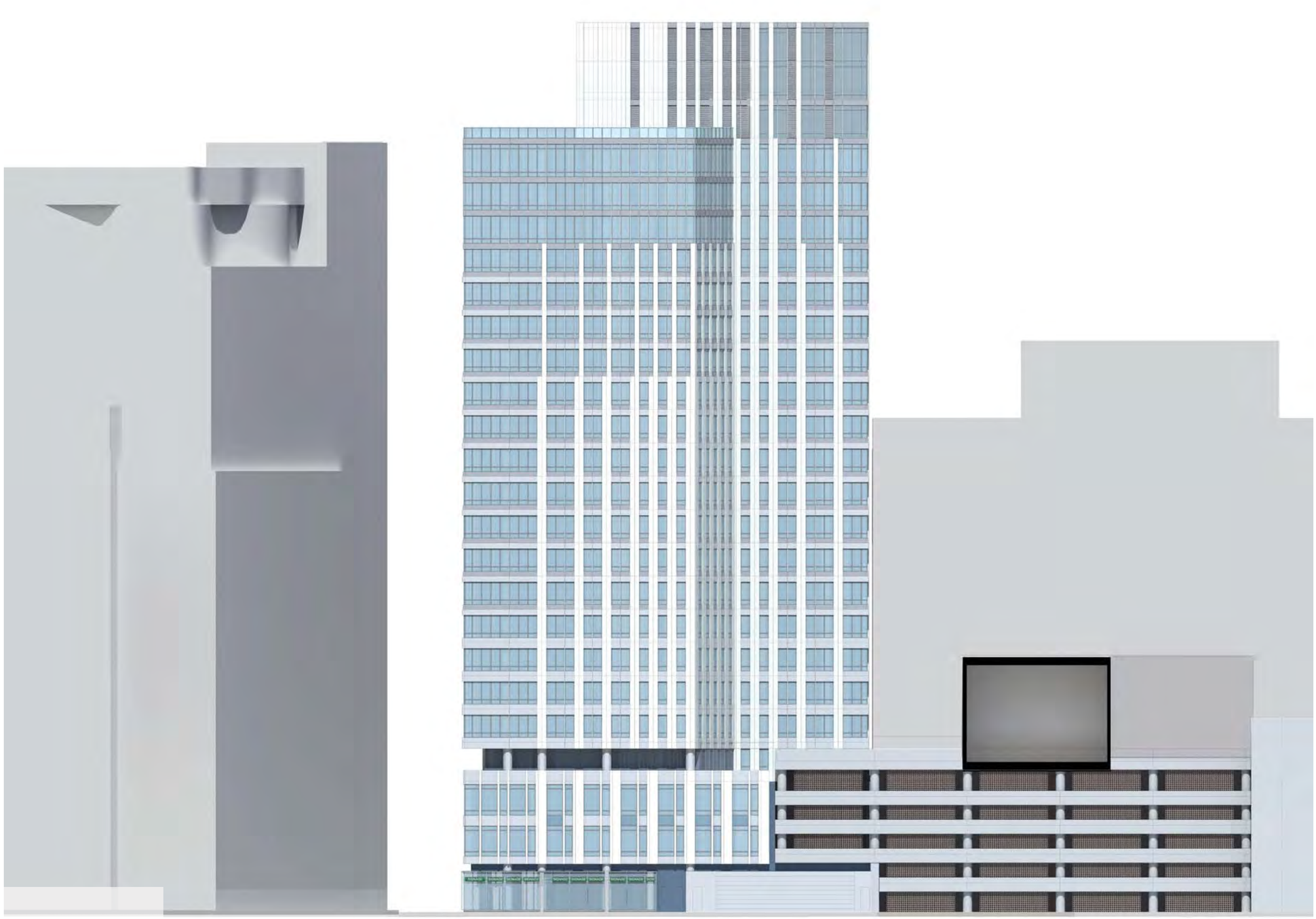
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Building Section

Figure 1.9

Ames Street Residences
Cambridge, Massachusets



0 16 32 Feet

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.10a

Building Elevation - South

Ames Street Residences
Cambridge, Massachusets

0 16 32 Feet

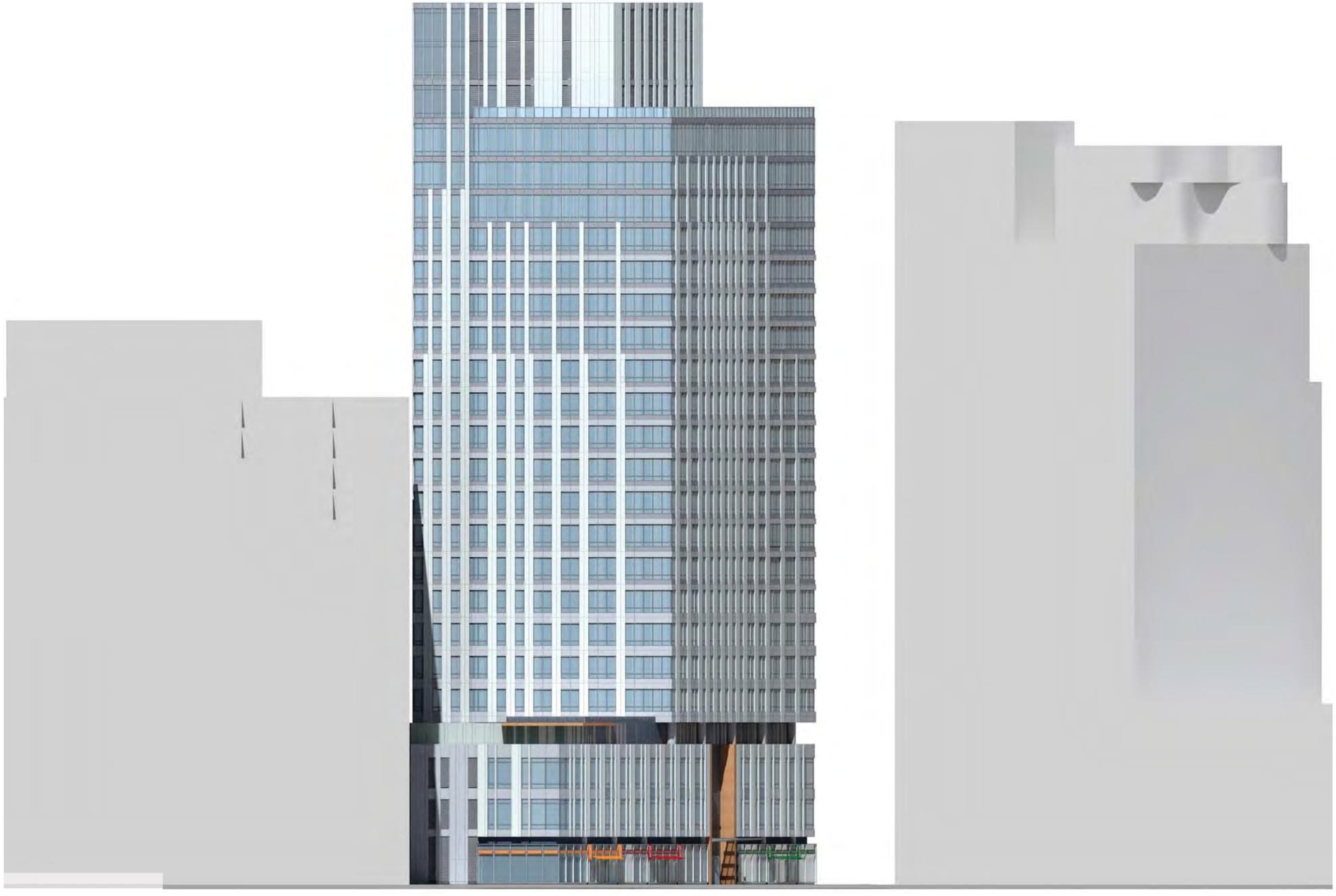
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.10b

Building Elevations - West

Ames Street Residences
Cambridge, Massachusets



0 16 32 Feet

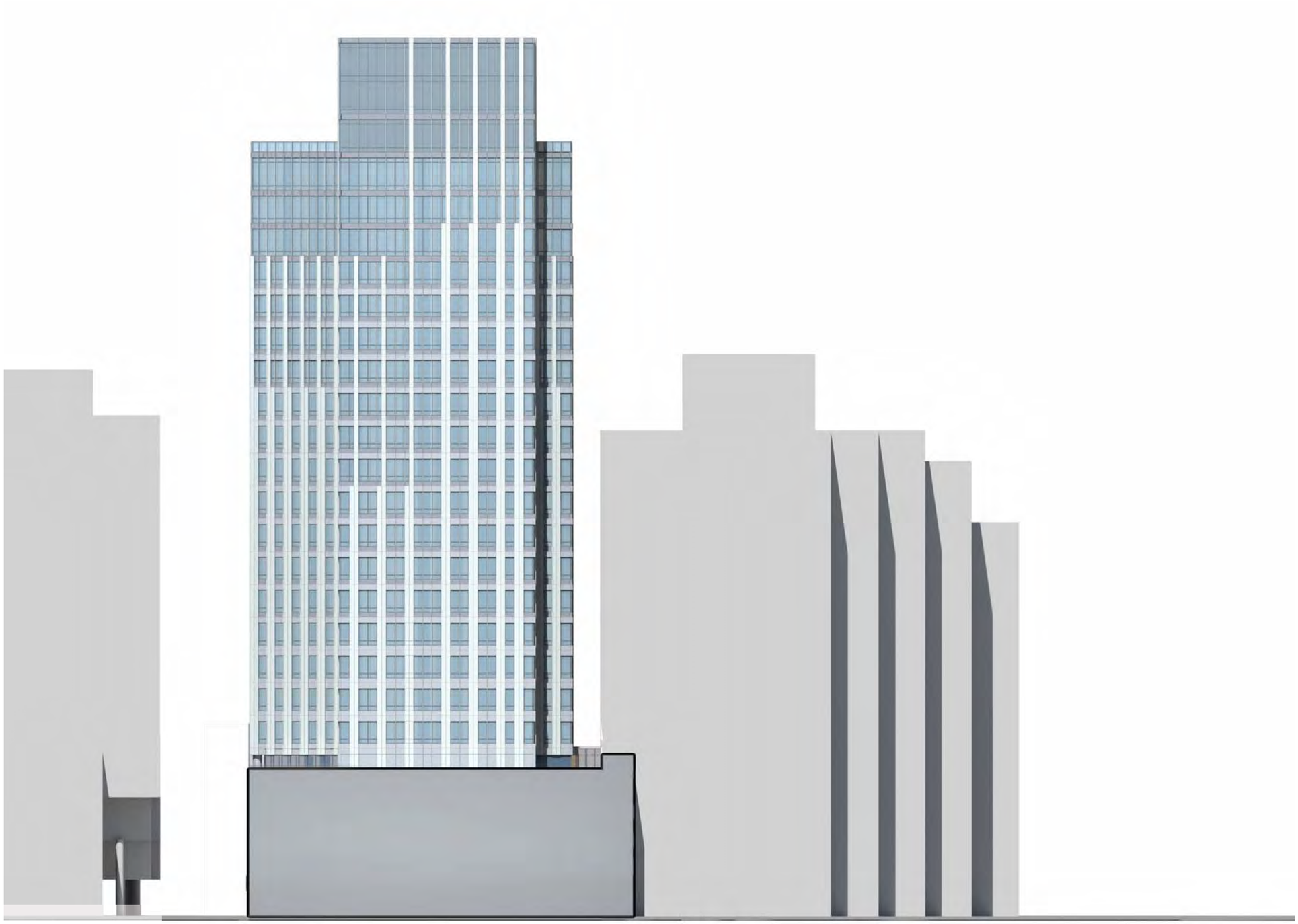
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.10c

Building Elevations - North

Ames Street Residences
Cambridge, Massachusets



0 16 32 Feet

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.10d

Building Elevations - East

Ames Street Residences
Cambridge, Massachusets

Overall View: Facade Concept

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

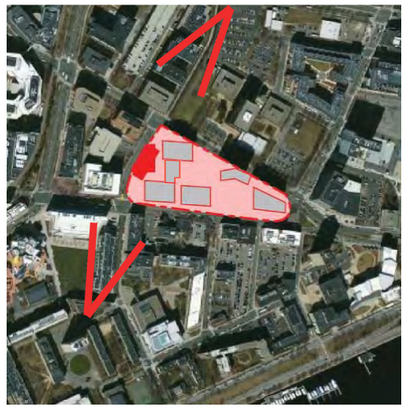
Figure 1.11a

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

Street View Looking South on Ames St.

Street View Looking North on Ames St.



Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11b

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

Street View Looking South on Ames St.

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11c

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

Street View of Ames St. Base

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11d

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

Street View of Ames St. Base with Second Floor Retail

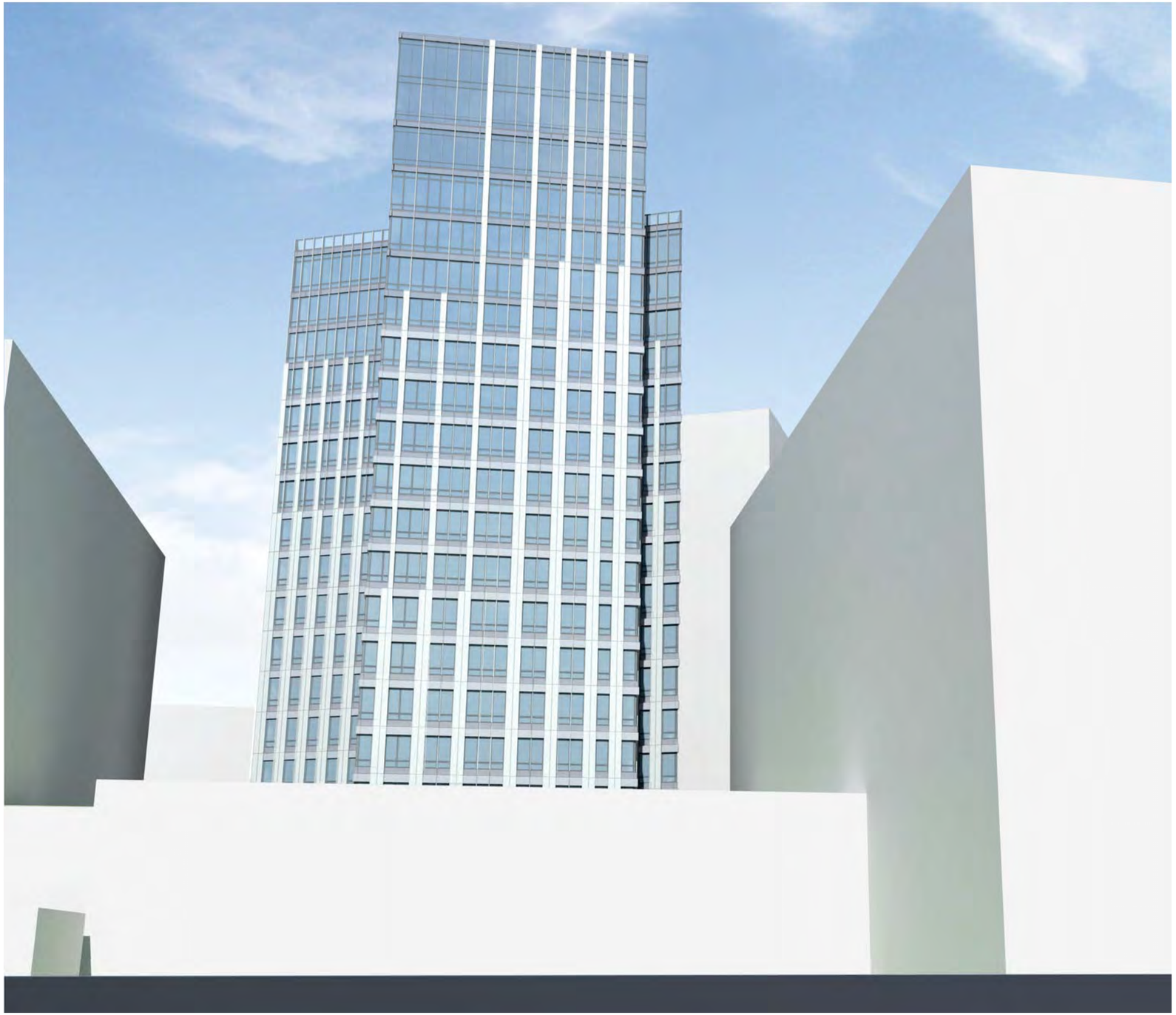
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11e

Project Perspectives

Ames Street Residences
Cambridge, Massachusets



View From Rooftop Open Space

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11f

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

View Looking West on Main St.

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.11g

Project Perspectives

Ames Street Residences
Cambridge, Massachusets

Existing Shadows
New Shadows
New Building

June 21, 9 AM

June 21, 12 PM

June 21, 3 PM

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.12a
Shadow Study - Summer Solstice

(June 21)

Ames Street Residences
Cambridge, Massachusets

Existing Shadows
New Shadows
New Building

March & September 21, 9 AM

March & September 21, 12 PM

March & September 21, 3 PM

Source: FXFOWLE

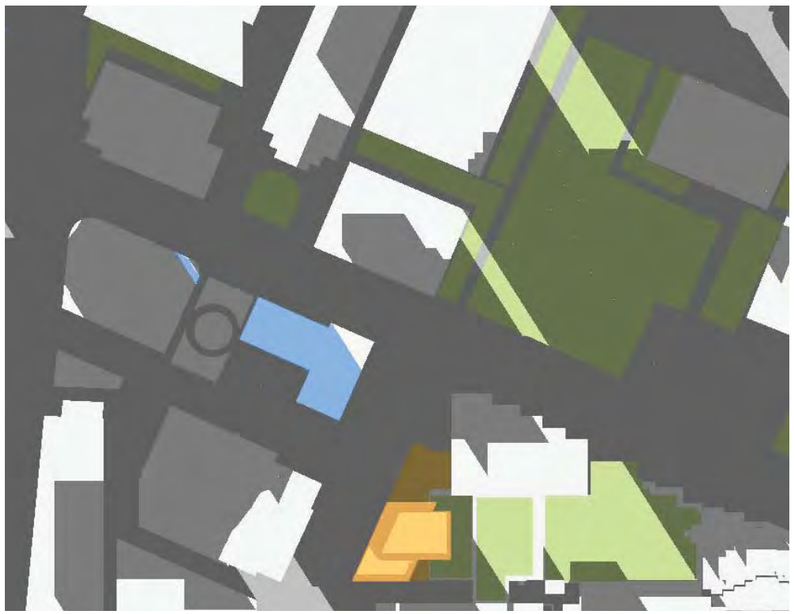
Vanasse Hangen Brustlin, Inc.

Figure 1.12b
Shadow Study - Equinox

(March 21 & September 21)

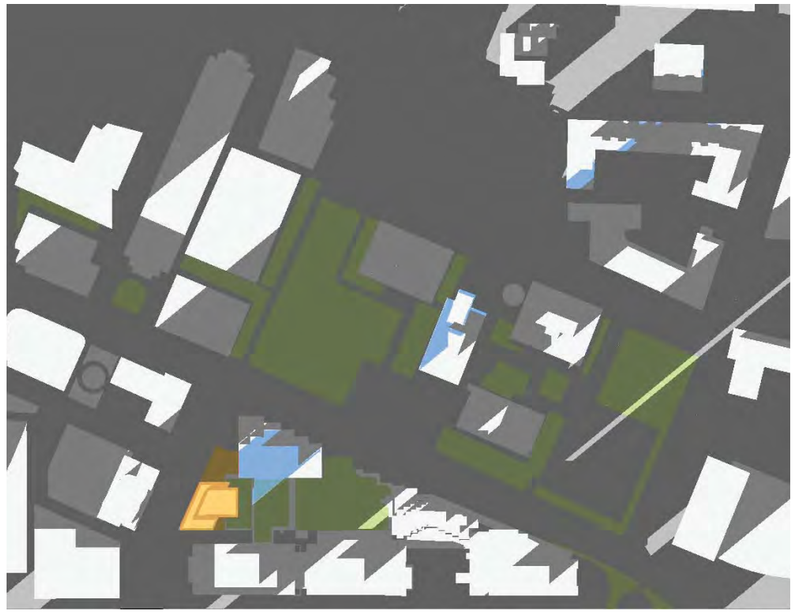
Ames Street Residences
Cambridge, Massachusets

Existing Shadows
New Shadows
New Building



December 21, 9 AM

December 21, 12 PM



December 21, 3 PM

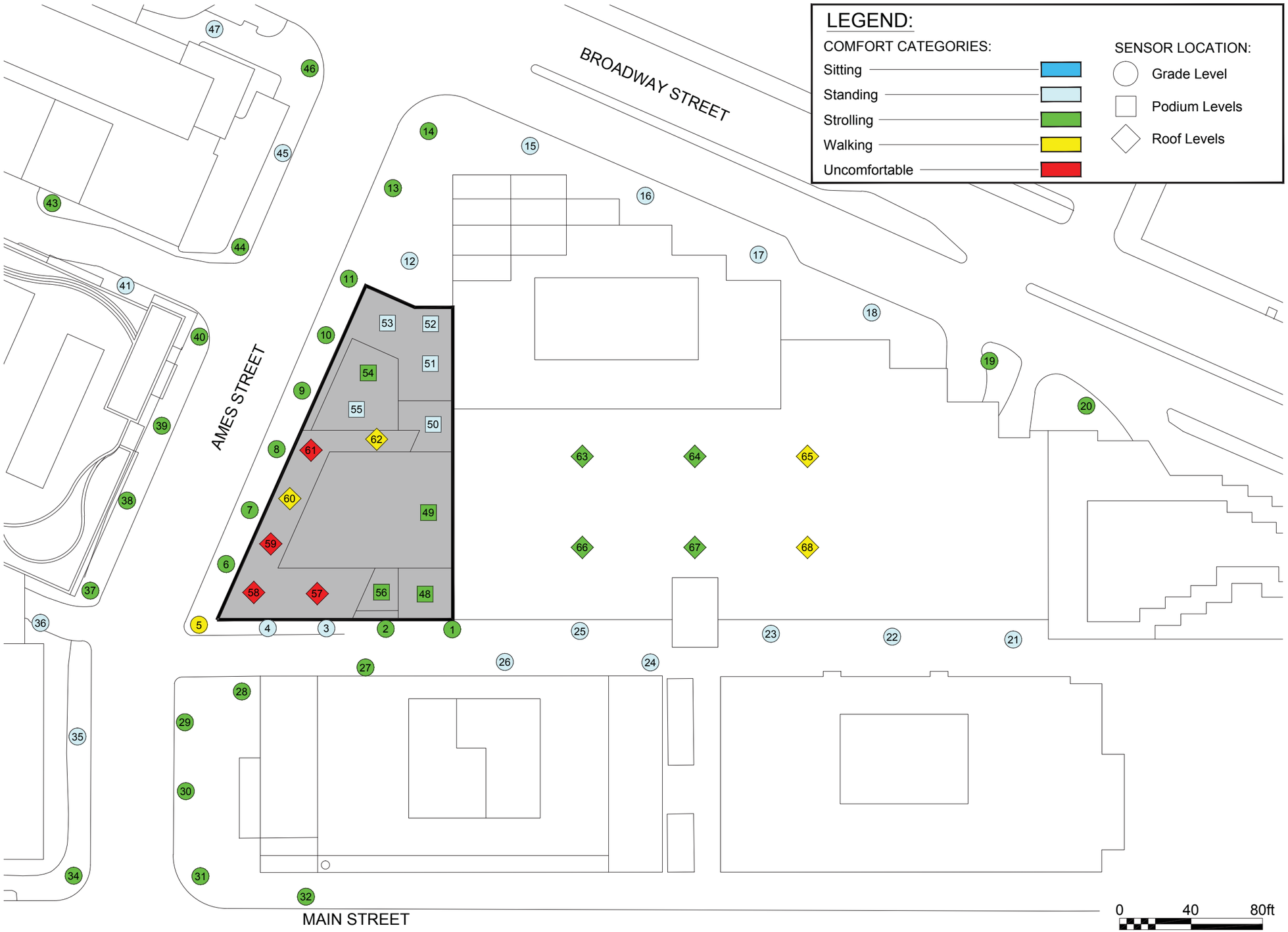
Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 1.12c
Shadow Study - Winter Solstice

(December 21)

Ames Street Residences
Cambridge, Massachusets



Source: Rowan Williams Davies & Irwin Inc.

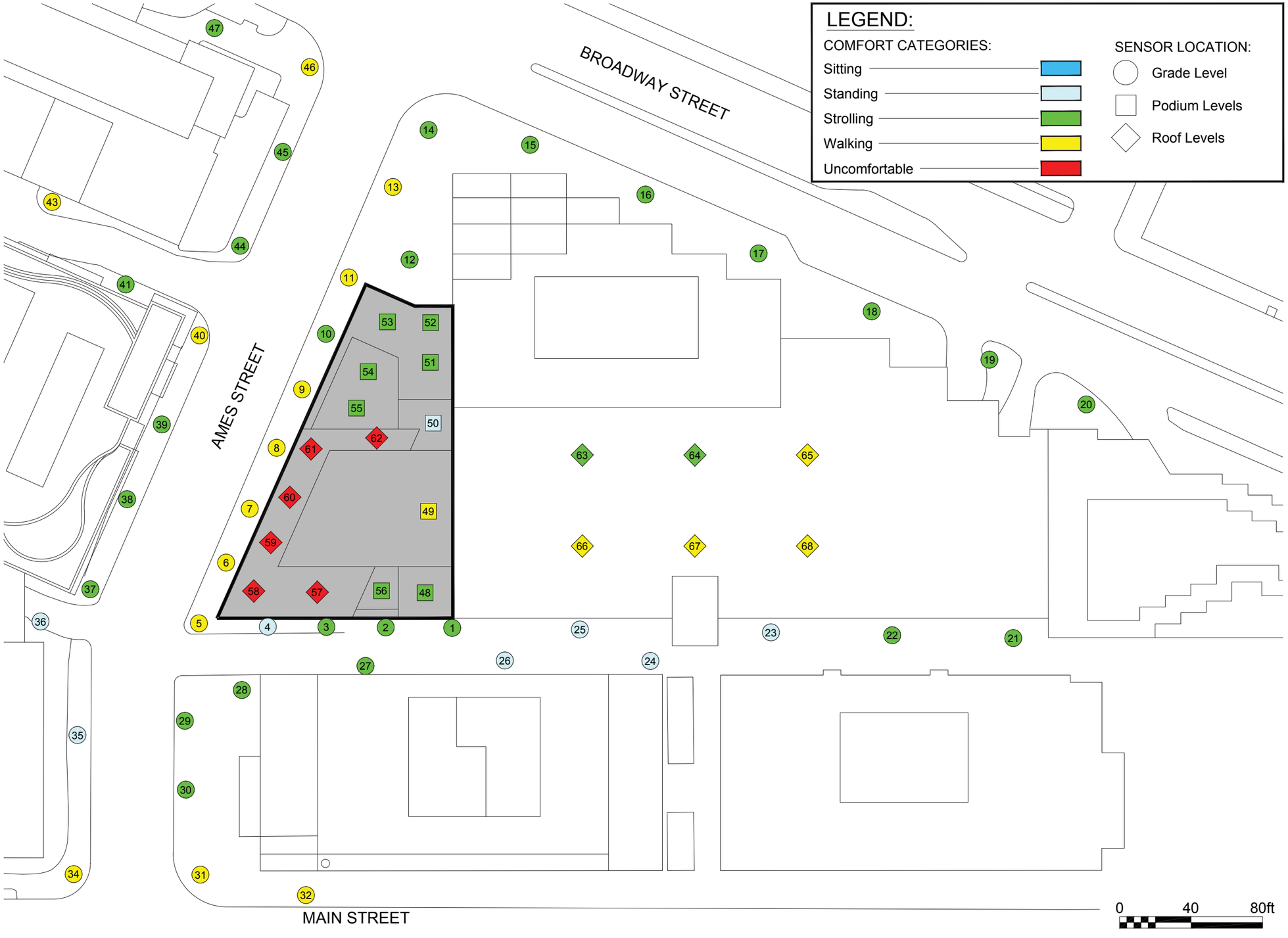
Vanasse Hangen Brustlin, Inc.

Figure 1.13a

Pedestrian Wind Study

Summer

Ames Street Residences
Cambridge, Massachusets



Source: Rowan Williams Davies & Irwin Inc.

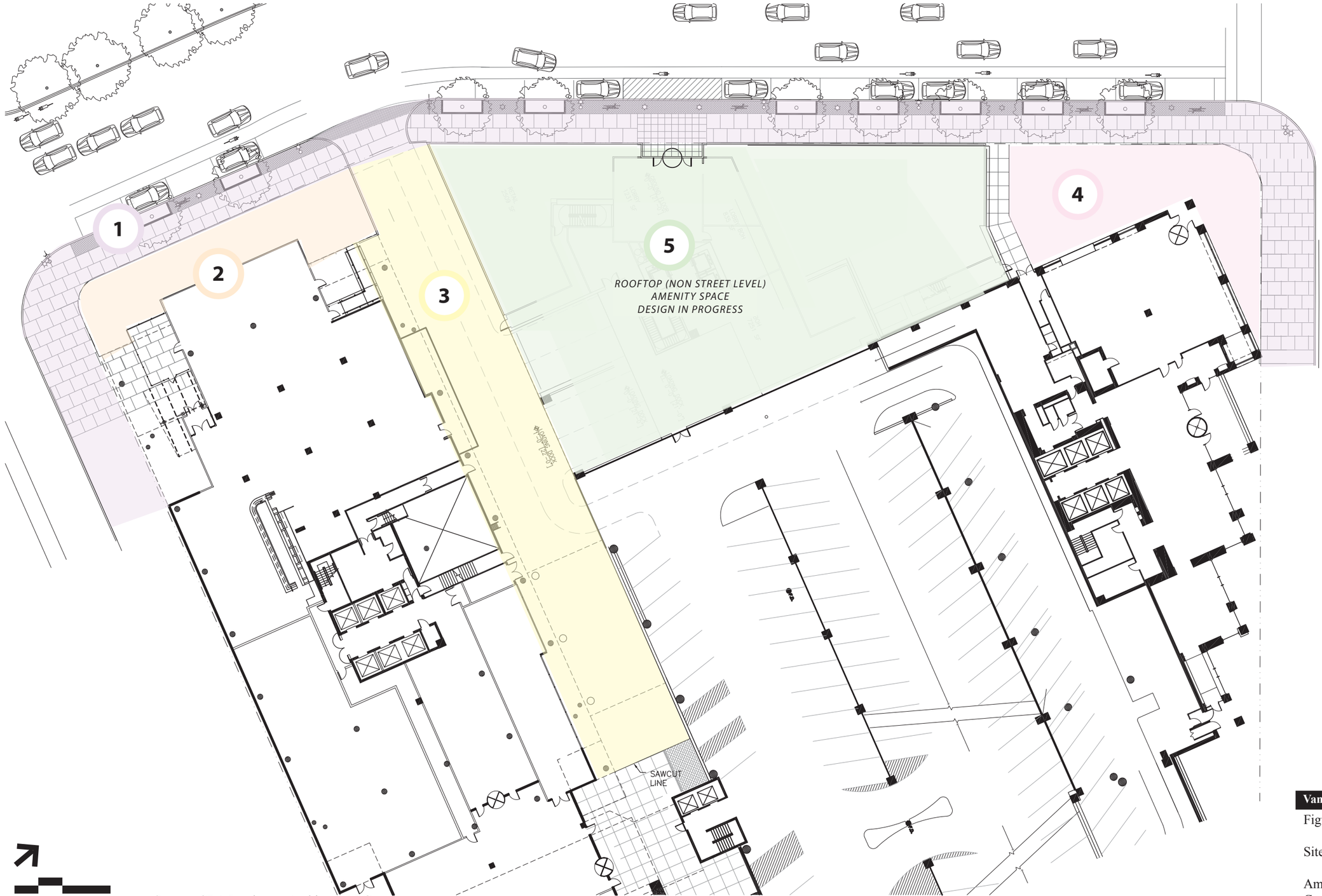
Vanasse Hangen Brustlin, Inc.

Figure 1.13b

Pedestrian Wind Study

Winter

Ames Street Residences
Cambridge, Massachusets



Source: CBA Landscape Architects LLC

USE AREAS:

1- Streetscape

2-Outdoor Seating/Open Space

3- "Pioneer Way"
Shared Use Path/Open Space

4- Outdoor Seating/Open Space

5- Roof Amenity Space-
Design to be Determined

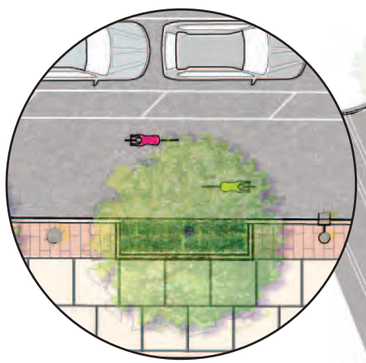
Vanasse Hangen Brustlin, Inc.

Figure 1.14

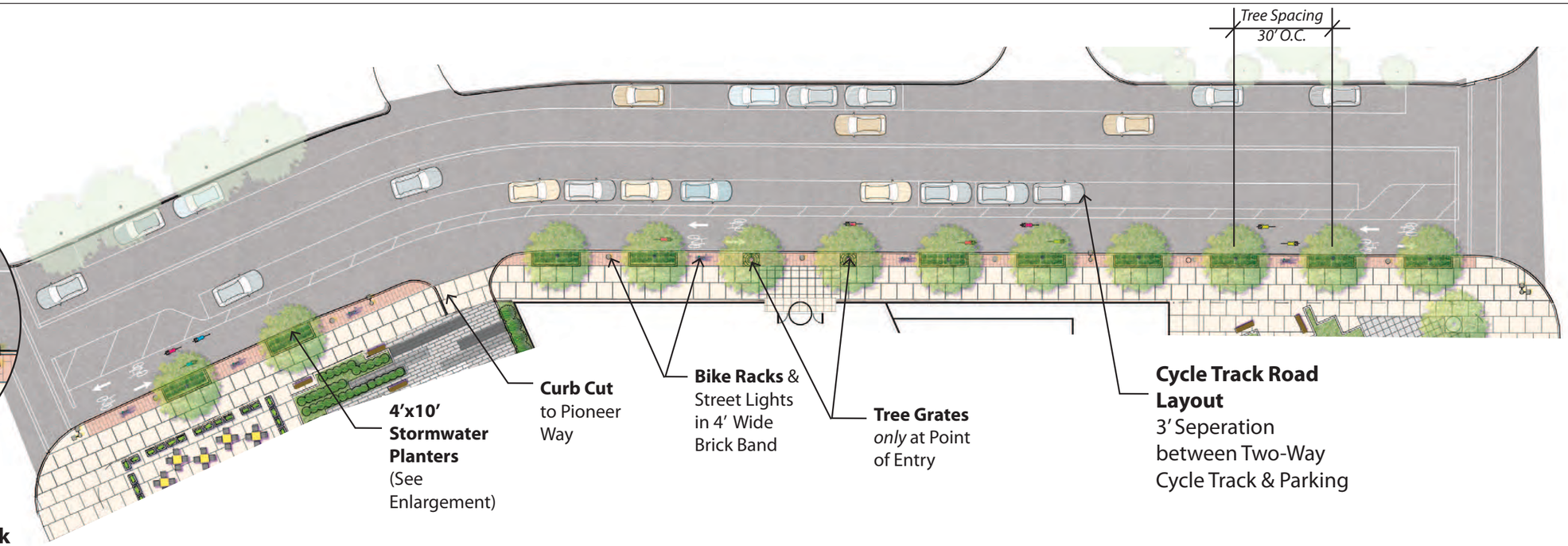
Site Planning & Landscape

Ames Street Residences
Cambridge, MA

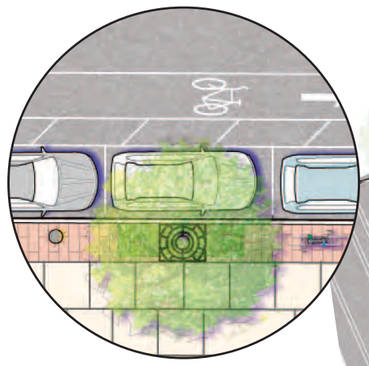
OPTION A



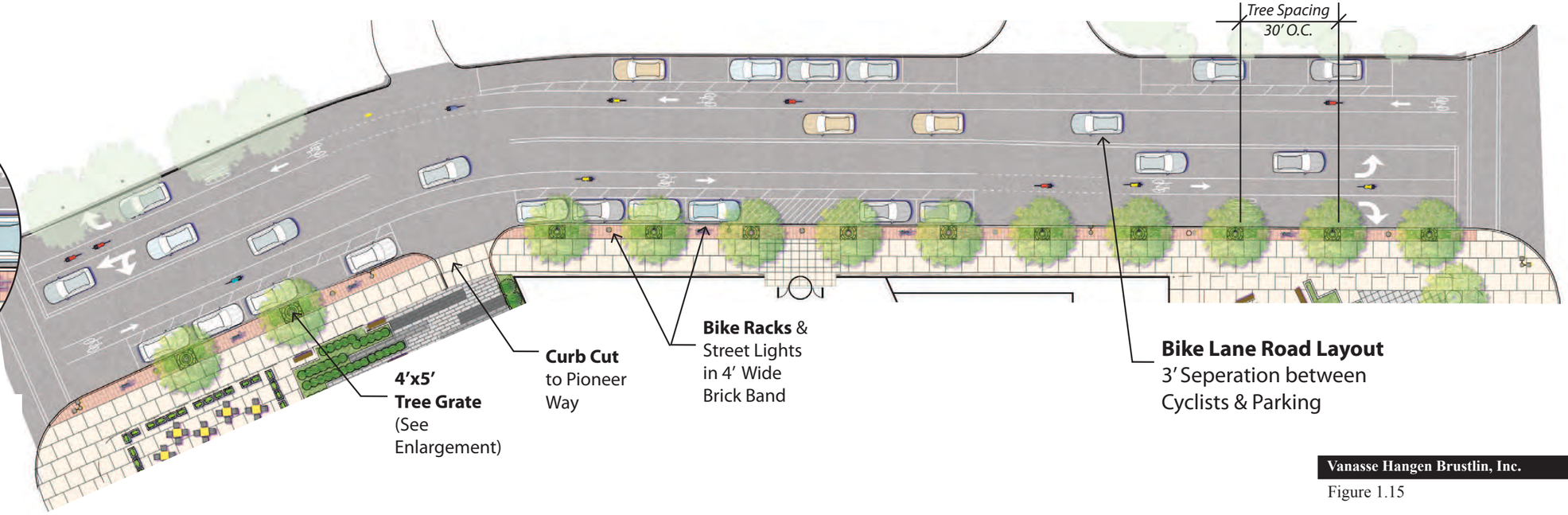
4'x10'
Tree Planter
with Parking & Cycle Track



OPTION B



4'x5'
Tree Grate
with Parking
& 3' Bike Lane
Seperation



Not to Scale

Source: CBA Landscape Architects LLC

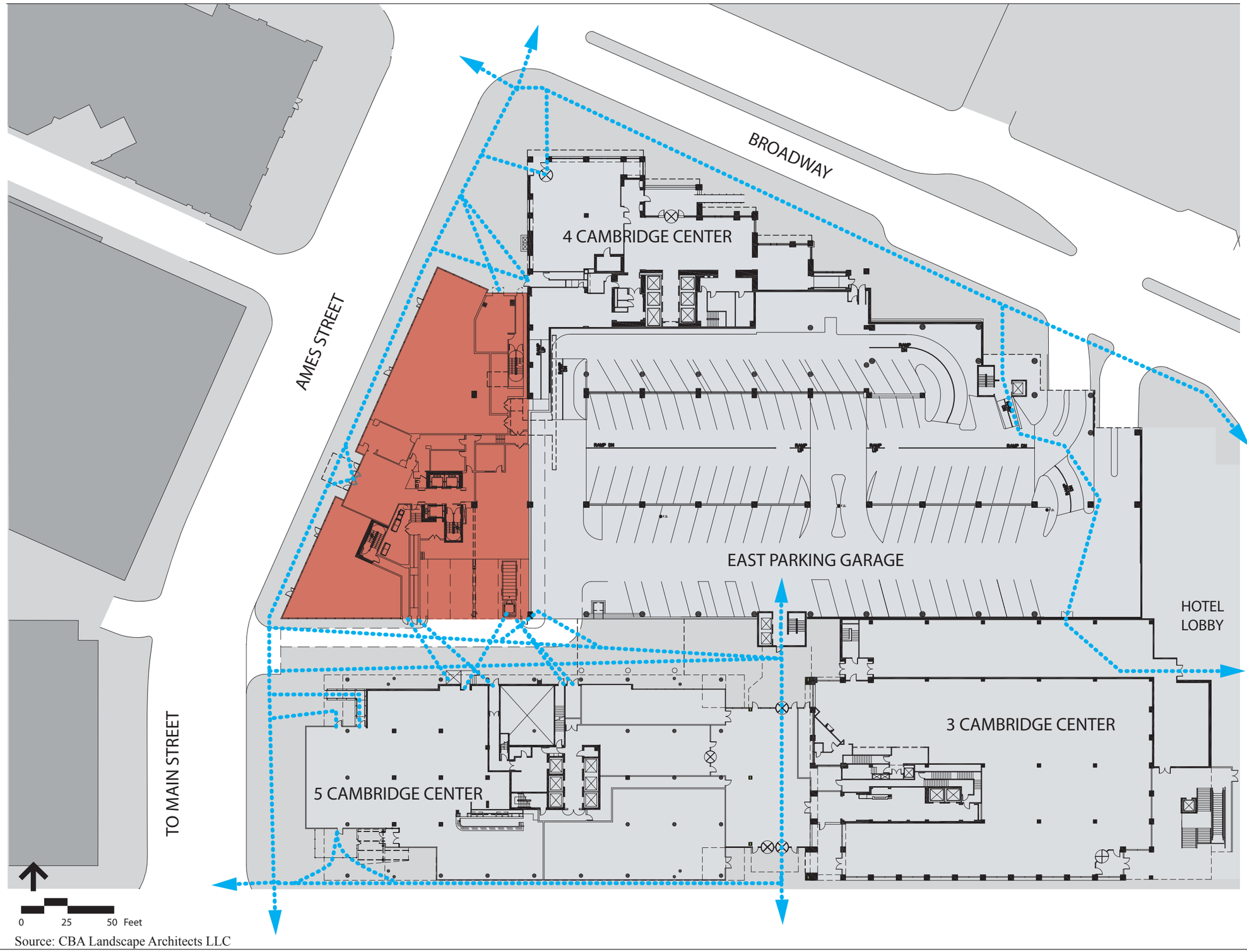
Note: *Options A&B currently under consideration by the City of Cambridge*

Vanasse Hangen Brustlin, Inc.

Figure 1.15

Streetscape Improvements

Ames Street Residences
Cambridge, MA



USE AREAS:

Proposed Project

Pedestrian Circulation Pattern

Source: CBA Landscape Architects LLC

Vanasse Hangen Brustlin, Inc.

Figure 1.16

Pedestrian Circulation

Ames Street Residences
Cambridge, MA

Source: CBA Landscape Architects LLC

Vanasse Hangen Brustlin, Inc.

Figure 1.17

Open Space Plan

Ames Street Residences
Cambridge, MA

2

Transportation and Parking

2.1 Introduction

This section describes the existing and proposed transportation conditions surrounding the Project Site and presents an overview of Traffic Impact Study (TIS) conducted to assess potential traffic impacts associated with the Project. The TIS, dated June 10, 2014, was certified by the City of Cambridge Traffic, Parking, and Transportation (TP&T) Department on July 7, 2014.

As discussed previously, the Project Site is located along the east side of Ames Street and bounded by 5 Cambridge Center to the south, 4 Cambridge Center to the north, and the East Garage to the east, with a portion of the Project Site occupying the western end of the garage itself. The East Garage was constructed as part of the Cambridge Center Master Plan with the intention to accommodate parking needs for multiple facilities constructed within the district, as well as to accommodate other area parking needs. The East Garage's existing parking capacity is 844 spaces, which are used by a combination of transient parkers, monthly tenant parking, and some basement parking that is reserved specifically for Marriott Hotel's use.

2.2 Traffic and Transportation

■

2.2.1 Traffic Capacity Analysis Overview

A TIS was developed for the Project that is consistent with Section IV, "Guidelines for Presenting Information to the Planning Board" of the City of Cambridge "Transportation Impact Study Guidelines," Sixth Revision dated November 28, 2011. The TIS responds to the scope dated April 14, 2014 defined by the City of Cambridge Traffic, Parking, and Transportation (TP&T) Department in response to a Request for Scoping dated March 20, 2014. A copy of the full TIS, including the City's scoping letter (which is included in the TIS technical appendix) is provided in Attachment 2.

The TIS has been prepared in conformance with the current City of Cambridge Guidelines for Transportation Impact Study required under the Article 19 Special Permit Project Review. The TIS document comprises three components, as follows:

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

The TIS includes inventories of physical and operational conditions in the study area including roadways, intersections, crosswalks, sidewalks, on-street and off-street parking, transit facilities, and land uses. Transportation data that were collected and compiled are presented, including automatic traffic recorder counts, intersection turning movement counts, pedestrian and bicycle counts, vehicle crash data, and transit service data. Traffic volumes were evaluated for a 2014 Existing Condition, a 2014 Build Condition, and two 2019 Build scenarios for each Ames Street reconfiguration concept (described further below) that include future background growth and other developments, as well as project trips, and off-site roadway improvements. The required TIS Summary Sheets and Planning Board Criteria Performance Summary are also included in Attachment 2.

The study area for the TIS comprises of seven intersections, including Broadway, Main Street, Galileo Galilei Way, Ames Street and Third Street as well as the site driveways. Refer to Figure E of the TIS (Attachment 2) for the traffic study area intersections.

■

2.2.2 Ames Street Corridor Reconfiguration

Enhancing and promoting sustainable transportation is an important objective for the City of Cambridge and planned changes to Ames Street support Cambridge's policies to promote improved pedestrian and bicycle infrastructure within the city. Two plans are currently being considered by the City. One alternative consists of reconfiguring the existing 4-lane Ames Street to support implementation of dedicated bicycle infrastructure along the corridor between Main Street and Broadway. The proposed reconfiguration of Ames Street as indicated by the City of Cambridge, including its future geometric condition is illustrated in Figure 2.1a. The current plan calls for a buffered 2-way cycle track along the east side of Ames Street with on-street parking separating bike travel from vehicle travel. Additionally, the pedestrian sidewalk along the east side of Ames Street would be widened considerably, from its current width of 11-14 feet to approximately 15.5 feet. To support these changes, Ames Street would be narrowed to two travel lanes (one lane for each direction of travel). These changes would also require adjustments to sidewalks, accessible ramps, and traffic signalization at the intersections of Ames Street/Main Street and Ames Street/Broadway. An alternate Ames Street layout, as illustrated in Figure 2.1b, has also been developed in addition

to the City of Cambridge layout. The alternate layout proposes bicycle lanes as opposed to a two-way cycle track.

■

2.2.3 Existing Public Transportation

The Project site is well served by multiple public transportation options in the area. The site is located within a 1/10th of a mile from the Kendall Square MBTA Red Line Station and one mile from Central Square MBTA Red Line Station. The MBTA Red Line provides service to/from Alewife to the northeast and both Braintree and Ashmont to the south. The MBTA Red Line also provides connections to the Green Line at the Park Street Station and the Orange and Silver Lines at Downtown Crossing Station. A connection to the Fitchburg Commuter Rail Line is provided at the nearby Porter Square MBTA Red Line Station.

The MBTA operates four bus routes within the study area, including the following:

 # 64: Oak Square - University Park, Cambridge or Kendall/MIT via North Beacon St.
This route connects Oak Square to University Park, Cambridge, and Kendall Station. The bus travels through the project study area along Broadway to Kendall/MIT station providing service between Central Square and Kendall.

 # 68: Harvard/Holyoke Gate - Kendall/M.I.T. via Broadway
This route connects Harvard Square and Kendall / MIT, travelling along Broadway, ending at Kendall/MIT Station.

 # 85: Spring Hill - Kendall/M.I.T. Station via Summer St. & Union Sq.
Route 85 is a local route connecting Spring Hill, Summer Street, Union Square and Kendall / MIT. The southern section of this route, serving Kendall Square, traveling along Broadway is within the project study area where it runs along the same route as the CT2 to Kendall / MIT.

CT2: Sullivan Square Station - Ruggles Station via Kendall/MIT Station
Route CT2 is a limited stop, cross-town route that operates between Sullivan Square and Ruggles Station. This route utilizes Main Street and Broadway to pass through Kendall/MIT station in the project study area.

In addition, the Charles River Transportation Management Association (TMA) operates the EZRide shuttle service between North Station, Lechmere Station, Kendall Square Station, University Park and Cambridgeport.

■

2.2.4 Existing Pedestrian and Bicycle Facilities

Pedestrian amenities surrounding the Project Site include sidewalks along Ames Street and Broadway, and crosswalks at the signalized intersections. Pedestrians are primarily provided concurrent walk times at the signalized intersections.

The Project Site is well-served by an evolving network of bicycle infrastructure. Broadway, Galileo Way, and Main Street have bicycle lanes. Also, the City plans to incorporate a multi-use path and a cycle track within the study area along Galileo Way. Within the study area of the Project Site there are multiple bicycle parking facilities including 215 covered spaces and 101 outdoor spaces. The Cambridge Center East Garage has 59 covered spaces, while Cambridge Center West Garage has 106 and Cambridge Center North Garage provides 50 covered bicycle parking space. Outdoor bicycle parking is provided at many of the Cambridge Center buildings included 12 spaces at 4 Cambridge Center and 12 at 5 Cambridge Center, nearest the Project Site. Hubway, which provides more than 1,300 bikes at 140 stations throughout Cambridge, Boston, Brookline, and Somerville, provides three (3) stations within walking distance of the Project Site. Two stations are located near the intersection of Third Street and Broadway/Main Street and a third station is located at the intersection of Main Street at Galileo Galilei Way.

■

2.2.5 Proposed Vehicular Access, Circulation, and Service/Loading

The following key access, circulation, parking, and service enhancements will be made in connection with the Project:

- Modification of the Ames Street geometric configuration to allow for provision of dedicated bicycle infrastructure.
- Modifications to the East Garage, including:
  - A reduction of approximately 40 actual parking spaces (although the garage may be operated on a managed parking basis in order to maintain its 844 vehicle parking capacity);
  - Relocation of the existing loading dock that serves 5 Cambridge Center; and
  - Other supporting garage access/egress modifications.

These modifications are discussed in greater detail below.

2.2.5.1 East Garage Parking Access and Circulation Modifications

Parking access to the East Garage will be modified to support the Project. The existing west entrance/exit point on Ames Street and adjacent loading dock will both be eliminated as part of the Project. As shown in Figure 2.2, all automobile access to the East Garage will be accommodated from the existing entrance on Broadway. Egress will be provided via the existing Broadway exit – and supported with an additional, new egress-only drive for non-transient users that would connect the garage back to Ames Street (just north of 5 Cambridge Center).

2.2.5.2 Service and Loading Modifications

As mentioned previously, the existing loading dock at the west edge of the East Garage that serves 5 Cambridge Center will be relocated as part of the construction of the Project and relocated along the southwest face of the garage with access/egress via Ames Street. This drive will serve the dual purpose of access/egress for the loading dock and egress only for the East Garage. The new dock will include four service bays sized to accommodate an SU-35 truck and will serve both the existing 5 Cambridge Center facility and the proposed Ames Street Residences.

2.2.5.3 Bicycle and Pedestrian Accommodations

Consistent with the TIS, the Project will provide a total of 296 secure, weather-protected bicycle parking spaces on-site accessible by residents and retail employees. This supply meets the zoning requirement of 1.05 bicycle spaces for each residential unit (294 spaces) and 0.1 bicycle spaces per 1,000 sf of retail space (2 spaces). As shown on Figure 2.3, locations for the long-term bicycle storage are conceptually being designed as a bike room in the existing garage and a dedicated multi-level bike shelter in Pioneer Way (to be weather-protected); however, the design, configuration, and locations may change as the building design is developed. The Applicant will work with the appropriate city departments on the design of the long-term bicycle storage. In addition, the Project will provide on-site short-term bicycle parking (38 spaces) at the ground-level along the perimeter of the Project Site on Pioneer Way (refer to Figure 1.17 for the proposed locations). This supply meets the zoning requirement of 0.6 bicycle spaces per every 1,000 sf. of retail and 0.1 spaces per residential unit.

As described previously, the east side of Ames Street will be reconstructed in connection with the Project, and the existing sidewalk will be widened significantly (from its current width of 11-14 feet to approximately 15.5 feet). Within and around the Project Site, pedestrian facilities will be designed to meet appropriate safety and accessibility standards. The proposed Pioneer Way between 5 Cambridge Center and the East Garage will accommodate pedestrians and provide a cut-through to Main Street. And, pedestrians traveling from Broadway will be able to circulate through the East Garage to access 5 Cambridge Center, the Marriot Hotel's

lobby, and Main Street as well as MBTA Kendall/MIT Station along a signed shared use zone (Figure 1.16). At the entry point and inside the garage, overhead lighting will be paired with signage and pavement markings to provide the visual cues necessary for visitors to find their way and for drivers to use caution while sharing the path of travel with pedestrians.

■

2.2.6 Transportation Demand Management

The Applicant will support a program of Transportation Demand Management (TDM) measures to reduce automobile trips generated by the Project. The goal of the proposed TDM plan is to reduce the use of single occupant vehicles (SOVs) by encouraging carpooling and vanpooling, bicycle commuting and walking, and increased use of the area's public transportation system by residents.

The following TDM programs will be implemented as part of the proposed project to encourage residents to use alternatives to SOV travel:

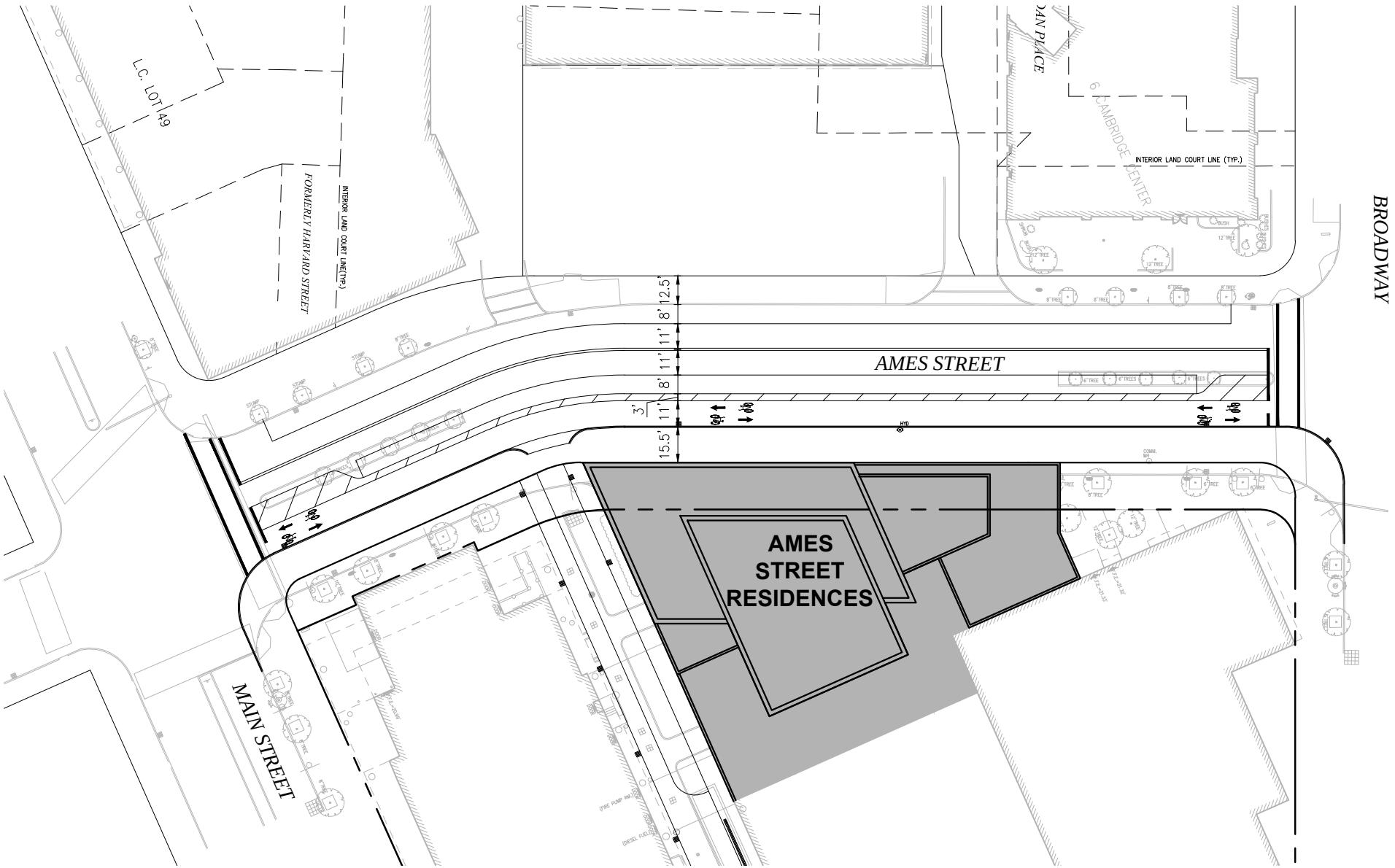
- The Applicant will contact a car sharing provider, such as Zipcar to determine the feasibility of establishing a car share program for tenants and will provide parking spaces on site for at least one car share vehicle, subject to demand.
- The Applicant will continue participating in the local Transportation Management Association (TMA) and reporting to the City of Cambridge Parking and Transportation Demand Management Officer.
- The Applicant will designate a Transportation Coordinator to oversee all transportation matters for the project, including vehicular operations, servicing and loading, parking and the TDM programs. The Transportation Coordinator will act as the contact and liaison for the City of Cambridge, the TMA, and the tenants of the Project.
- The Applicant will make available transit maps, schedules and other information relevant to commuting options in the residential building lobby, management office, or through a building website.

2.3 Parking/ Shared Parking Analysis

No new parking will be constructed as part of the Project. A portion of the East Garage will be reconfigured to accommodate the Project's building footprint, resulting in a loss of approximately 40 actual spaces; however, the garage may be operated on a managed parking basis in order to maintain its 844 vehicle parking capacity.

Studies of existing garage occupancy indicate that the average peak weekday accumulation within the garage is about 668 spaces (83% weekday mid-day occupancy). During evenings and weekends, parking availability within the garage is considerable (only about 15 percent occupied). Per zoning requirements, the Project is allocating 0.5 spaces per unit for the project, or 140 spaces, for residents. This amount would represent the maximum parking need on weekday evenings and weekends, when garage use is light (the proposed residential use

provides a great opportunity for shared parking within Cambridge Center). During weekdays, we estimate that no more than half of the resident parkers would be located within the garage (or about 70 total weekday parkers). Even with a potential modest reduction in capacity, the East Garage will be able to accommodate the parking demand generated by the Project.

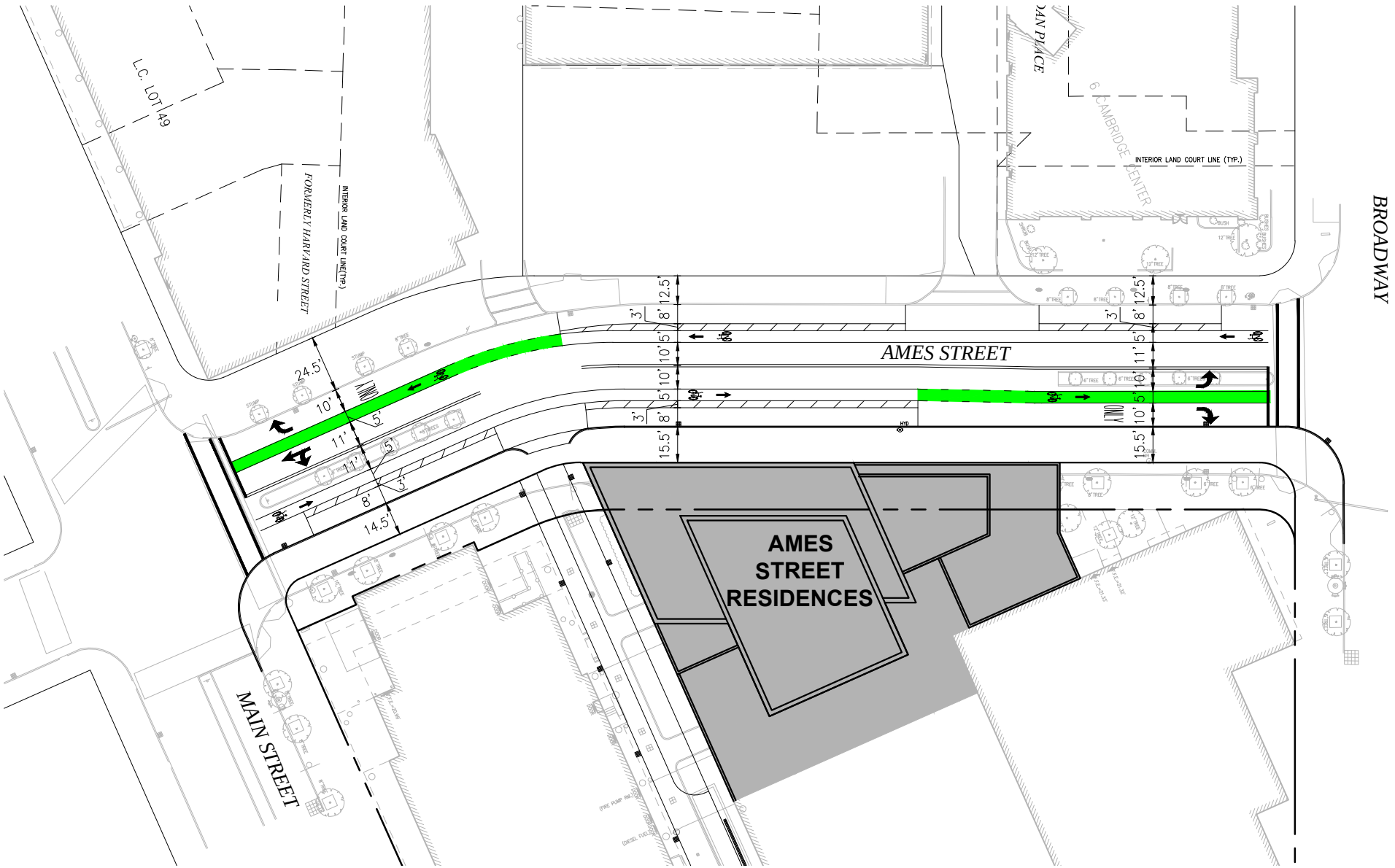


Vanasse Hangen Brustlin, Inc.

Figure 2.1a

Ames Street Layout
City of Cambridge Cycle Track Concept
Ames Street Residences
Cambridge, MA

0 30 60 Feet

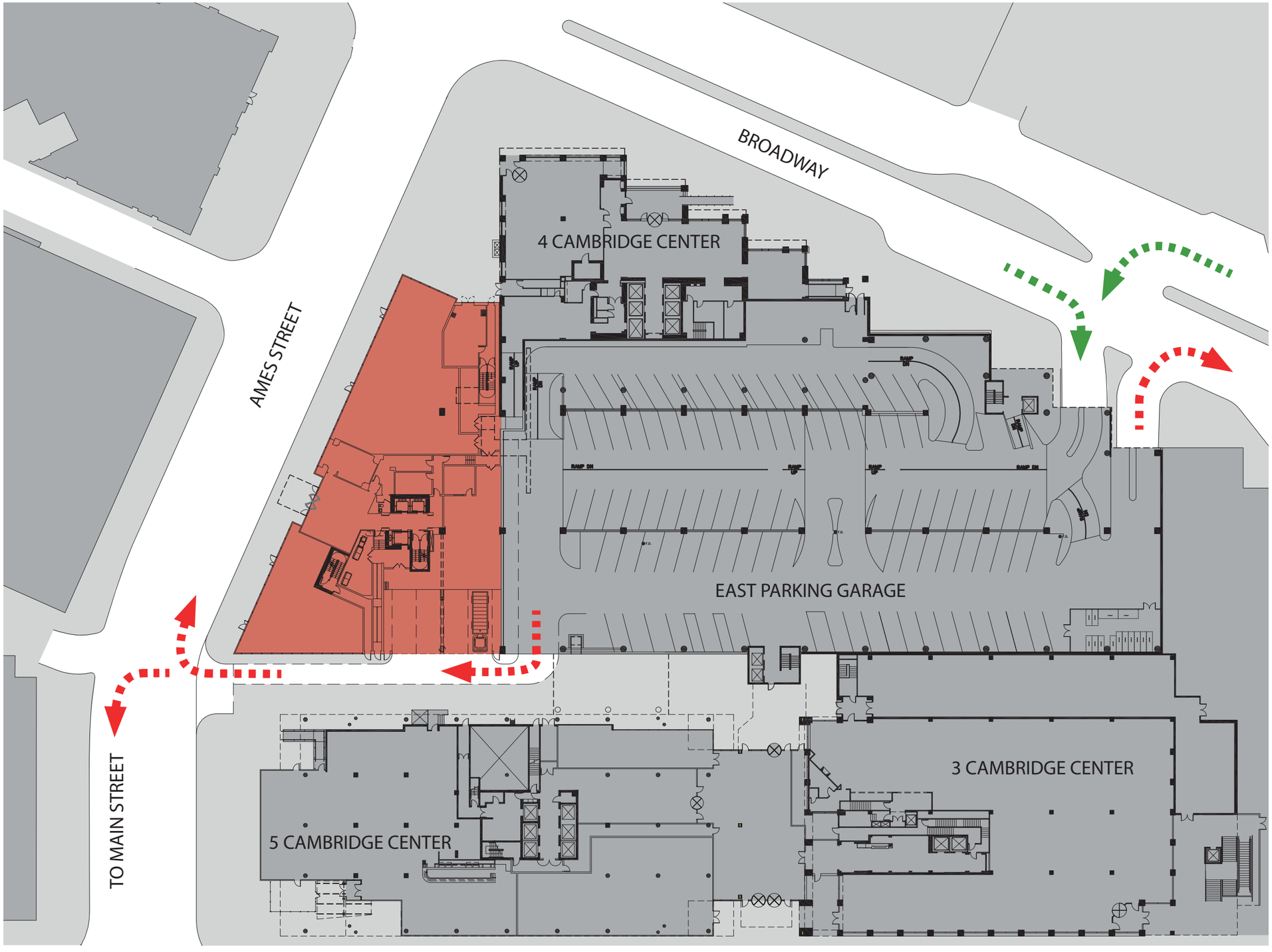


Vanasse Hangen Brustlin, Inc.

Figure 2.1b

Ames Street Layout
Alternative Bike Lane Concept
Ames Street Residences
Cambridge, MA

0 30 60 Feet



Proposed Project

Parking Access

Parking Egress

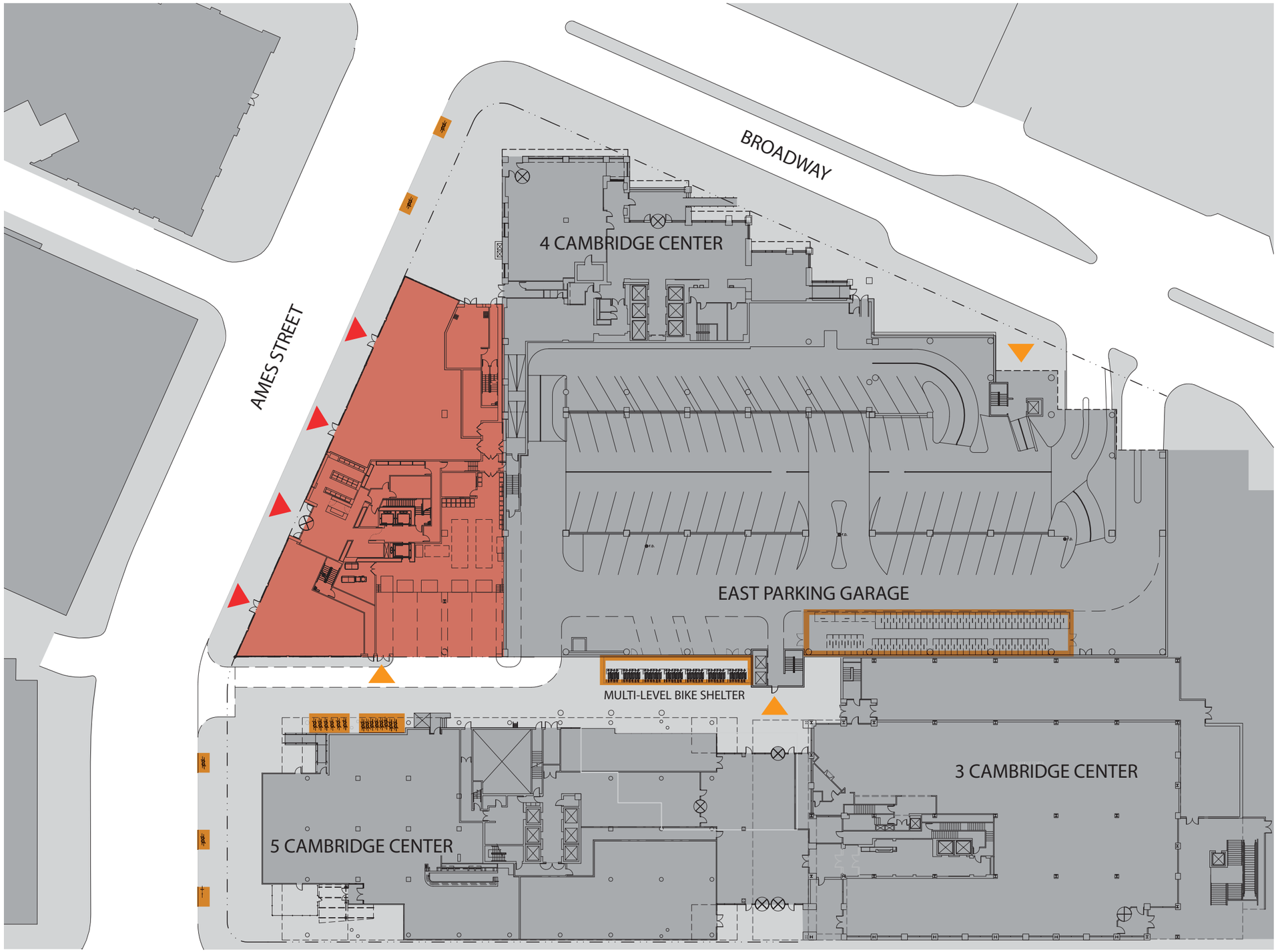
Vanasse Hangen Brustlin, Inc.

Figure 2.2

Proposed Vehicular Parking

Access / Egress

Ames Street Residences
Cambridge, Massachusetts



Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 2.3

Proposed Bicycle Parking Layout

Ames Street Residences
Cambridge, Massachusetts

3
Infrastructure

3.1 Introduction

This section describes the existing infrastructure systems within and surrounding the Project Site, and discusses Project capacity needs and potential impacts on utilities. The following utilities are evaluated: wastewater, water, stormwater management, natural gas, electricity, and telecommunications. Figure 3.1 shows the existing utilities that serve the Project Site.

The Project will connect to existing city and utility company systems in the adjacent public streets. Based on initial investigations and consultations with the appropriate agencies and utility companies, all existing infrastructure systems are adequately sized to accept the incremental increase in demand associated with the development and operation of the Project. As design progresses, all required engineering analyses will be conducted and the final design will adhere to all applicable protocols and design standards ensuring that the proposed building is properly supported by and properly uses city infrastructure. Detailed design of the Project's utility systems will proceed in conjunction with the design of the building and interior mechanical systems.

The systems discussed herein include those owned or managed by the Cambridge Public Works Department (CPWD), Cambridge Water Department (CWD), private utility companies, and on-site infrastructure systems.

The relocation of the street edge and utilization of the portion of the former street area for building elements will require some utility relocations in Ames Street along the site frontage. This includes the relocation of a sanitary sewer main, a gas main, temporary electrical service relocation and various telecommunications lines. Design and construction of these relocations will be fully coordinated with the Cambridge Department of Public Works as the project design advances.

3.2 Sewer and Water Infrastructure

The Project will connect to sewer and drain infrastructure in Ames Street at the site frontage.

To comply with the Cambridge Sewer design standards, the sanitary sewer system for the Ames Street Residential building will include an onsite retention tank to hold up to 4 hours of peak flow, thus protecting the existing sanitary sewer infrastructure in the area.

Water connections for fire protection and domestic use are available along the site frontage.

The Applicant will work with the CPWD and CWD on the development of the project design and submit plans for formal approval prior to the issuance of the Building Permit for the Project.

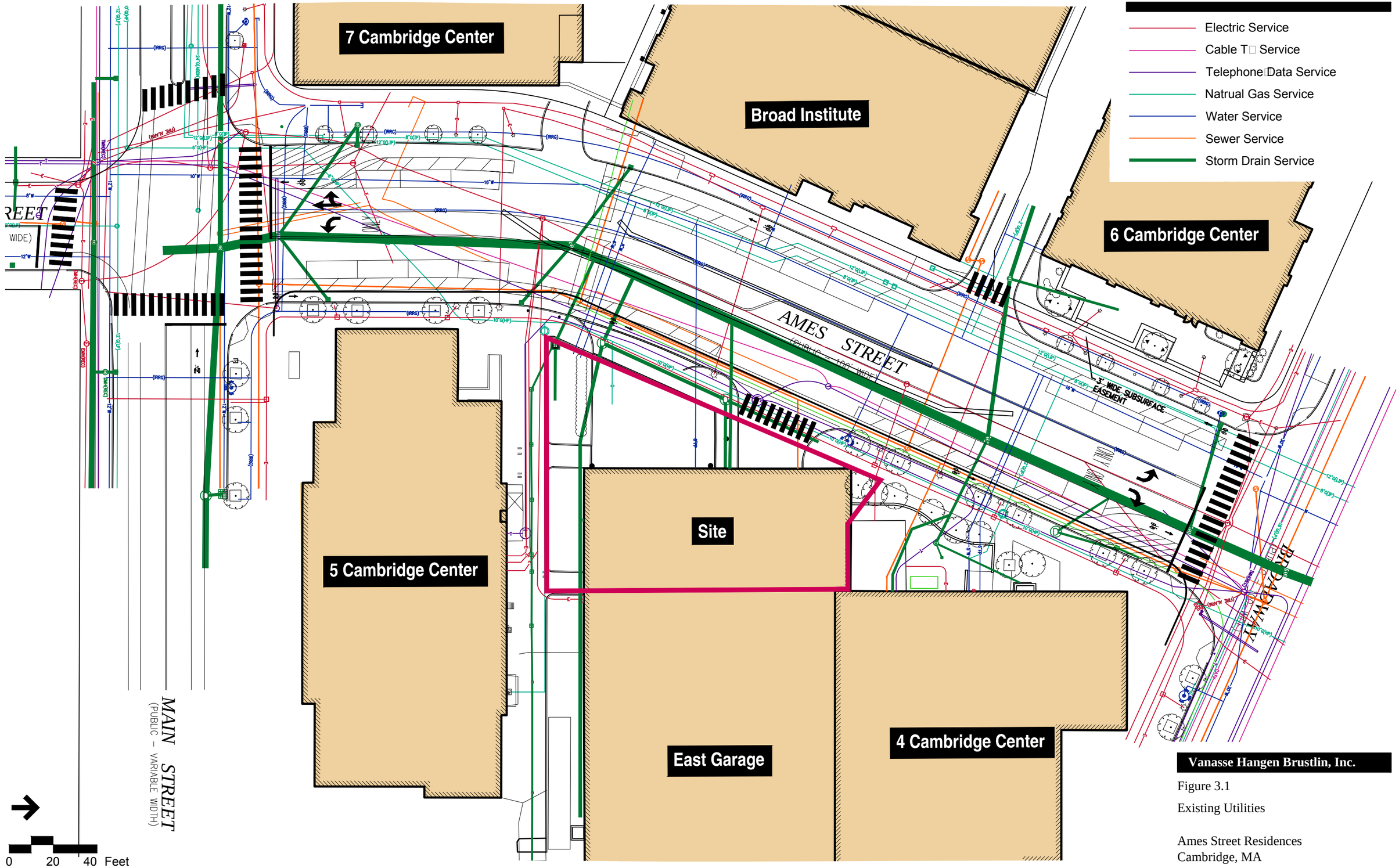
3.3 Stormwater Management

Since the Project Site is already impervious, the Project will not produce significant changes in either the pattern of, or rate of, stormwater runoff. Stormwater management controls will be established in compliance with the CPWD standards. The Project will not result in the introduction of any peak flows, pollutants, or sediments that would potentially impact the receiving waters of the local municipal stormwater drainage system.

The site drainage system completed as part of Google Connector project included and rainwater detention and infiltration system anticipated and includes capacity for the Project. The use of detention and infiltration as part of the Project's stormwater management system will reduce site peak flows, replenish groundwater and provide quality treatment for building roof runoff. The onsite detention/infiltration system design complies with the City of Cambridge's Low Impact Development Guidelines. Final connections to this system will be reviewed and approved by the Cambridge Public Works Department prior to construction.

3.4 Other Utilities

The Project will also require electrical, natural gas, and telecommunications services all of which are immediately available within the Ames Street right-of-way. The project team will work with the respective private utility authorities on sizing and configuration of services. The design of these utilities will be included on the CPWD and CWD submission drawings to ensure that the work is coordinated as part of the public review process.



Vanasse Hangen Brustlin, Inc.

Figure 3.1

Existing Utilities

Ames Street Residences
Cambridge, MA

4

Citywide Urban Design Objectives

4.1 Introduction

The following section demonstrates that the Project conforms with Article 19.30: Citywide Urban Design Objectives.

4.2 Conformance with Article 19.30

■

4.2.1 19.31: Responsive to Existing or Anticipated Development

The proposed building aims to fill a "missing tooth" in the street wall of Ames Street where there is currently an exposed mid-block parking garage set back from the street, as shown previously in Figure 1.4. The Project will remove a portion of the East Garage and replace it with the base of the tower concealing the parking structure behind active uses.

The proposed residential building is generally consistent with the heights of buildings on this block of Ames Street; thereby, responding to its immediate context. The Project Site is surrounded by structures of varying heights. The proposed residential building will be taller than the existing buildings on either side of it (i.e., 4 and 5 Cambridge Center). This is a mirror image of the condition across Ames Street where the middle building is also taller than the buildings on either side. The massing of these two buildings, directly across the street from each other, aims to create a balance on each side of Ames Street.

The architectural aesthetic of the proposed residential building complements adjacent and nearby structures with an architectural language representative of the progressive and forward-looking nature of the City of Cambridge. The expression of the proposed residential building reflects this with a contemporary glass and precast concrete façade that complements the mix of masonry and other materials used in nearby structures.

The proposed massing respects the immediate and city-wide context. A horizontal reveal located between 40 feet and 55 feet above the sidewalk identifies a clear base for the upper residential floors and creates a scale that relates to pedestrians. The lower tower aims to relate to the street scale by matching the height of adjacent buildings and a taller massing aims to create an iconic top for the building to relate to the city scale and skyline.

■

4.2.2 19.32: Pedestrian and Bicycle-Friendly; Relationship to Surroundings

The main entrance lobby will front directly on Ames Street and will be flanked on either side by retail frontage. These uses will replace an existing parking structure along Ames Street frontage to provide retail continuity on this side of the block that will engage pedestrians. Activity will spill out onto the street from improved open spaces adjacent to the proposed residential building, thus creating an enhanced pedestrian experience along the entire block frontage. The improved open spaces will mix public open space areas with restaurant seating to support a lively mix of uses and an active pedestrian experience.

Pioneer Way will be enhanced with plantings, climbing vines, short- and long-term bicycle parking and designed screens to improve the aesthetic of currently blank walls. Lighted bollards and textured paving will define Pioneer Way as a multi-use space accommodating auto, bicycle, pedestrian and service uses.

The block of Ames Street on which the Project is located is excessively wide and not scaled for pedestrians. The roadway will be narrowed with the building street wall meeting the narrower right of way. The design will narrow the building face-to-face dimension, improving communication between both sides of the street making the experience more pedestrian friendly. While the width of Ames Street is being narrowed, the bicycle lane arrangement will be improved (as described more fully in Section 2, *Transportation and Parking*).

As shown in Figure 2.3, secure, weather-protected long-term bicycle storage will be provided on-site for new building residents and retail employees, as required by zoning. In addition, short-term bicycle racks will be provide on-site at the ground level. Refer to Section 2, *Transportation and Parking* for further details.

■

4.2.3 19.33: Environmental Impacts and Mitigation

The Project has been designed to minimize impacts to adjacent properties. The rooftop mechanical equipment will be well organized, and, as shown in Figure 1.8h, will be enclosed in a penthouse and visually screened from its surroundings and acoustically buffered from neighbors.

On the ground-level, the service/loading entrance on Pioneer Way will be oriented to be obscured from view from Ames Street frontage. All delivery vehicles will be staged on-site at the relocated loading bays. Trash will be managed and contained within a single location on the ground-level of the Project Site.

Project-related vehicular traffic is anticipated to be reduce through the incorporation of bicycle accommodations on-site as well as the implementation of a TDM plan.

Since the Project Site is already impervious, the Project will not produce significant changes in either the pattern of, or rate of, stormwater runoff. The use of detention and infiltration as part of the site stormwater management system, established in compliance with the CPWD standards, will reduce site peak flows, replenish groundwater and provide quality treatment for building roof runoff.

The proposed open space and landscape design will introduce approximately 15,680 square feet of public open space, in addition to the public sidewalk area. Design features such as streetscape with trees and planting beds, and a number of pocket parks landscaped with contemporary shade-tolerant low growing woodland plantings will help reduce the rate and volume of stormwater runoff in addition to serving as visual amenities.

Based on the shadow studies presented in Section 1, *Project Description*, the Project will result in only a very minimal amount of new shadow on the public roof garden east of the Google Connector at 3 PM on June 21.

The pedestrian wind study demonstrates that as a result of the Project all at-grade and lower podium level locations are predicted to pass the criterion used to assess pedestrian wind safety and appropriate wind comfort conditions are expected throughout the year along sidewalks surrounding the Project.

■

4.2.4 19.34: Adequate City Infrastructure Services

As discussed previously in Section 3, *Infrastructure* the Project will connect to existing city and utility company systems in the adjacent public streets. Based on initial investigations and consultations with the appropriate agencies and utility companies, all existing infrastructure systems are adequately sized to accept the incremental increase in demand associated with the development and operation of the Project.

The proposed residential building has been designed to include water-conserving plumbing (in accordance with LEED). The Project will not produce significant changes in either the pattern of, or rate of, stormwater runoff. Stormwater management controls will be established in compliance with the CPWD standards. The Project will not result in the introduction of any peak flows, pollutants, or sediments that would potentially impact the receiving waters of the local municipal stormwater drainage system.

The proposed residential building has been designed to conserve water and energy in construction, maintenance, and long-term operation of the building. Based on the preliminary building energy modeling results, the Project is currently approximately 20 percent more efficient than a conventional building, in compliance with the MA Stretch Energy Code requirements. Compliance with LEED certification standards and other evolving environmental efficiency standards is presented in Section 6, *Sustainable Design and Development*.

■

4.2.5 19.35: Reinforce and Enhance Urban and Historical Context

Cambridge has a rich history of mixed use neighborhoods, a walkable environment, and an engaging pedestrian experience. The proposed residential building will contain ground-floor retail uses aimed to create and support a vibrant street level pedestrian experience. The building juxtaposes a taller tower element over the main building massing, which will create a signature element on the Cambridge skyline while still maintaining the continuity of the overall block in scale with the other buildings that line the block.

An enhanced Pioneer Way breaks down the scale of the block by providing access to the interior block parking structure and providing a pedestrian connection to Main Street and Broadway by way of the Cambridge Passageway.

■

4.2.6 19.36: Expand Housing Inventory

The Project will bring much needed residential units (280 units total) to the neighborhood, helping transform the Cambridge Center development transform into a 24-hour community. The Project will include 36 affordable units in full compliance with the Ordinance.

■

4.2.7 19.37: Enhance and Expand Open Space

The building footprint meets the new narrower street layout as it brings the building massing in front of the existing building face on either side, which will create two new corner public open spaces on either side of the building. These new public open spaces will include a mix of public/private functions that will help to activate the pedestrian experience by bringing activity to the edge of the sidewalk. The new public corner open spaces will be physical and visual gateways to this block of Ames Street and will complement the plaza at the Kendall/MIT T Station and Point Plaza Park.

5

Criteria for Issuance of Special Permits

5.1 Introduction

The following section demonstrates how the Project conforms with Article 10.43: Criteria for Issuance of Special Permits.

5.2 Demonstrate Conformance with Article 10.43

■

5.2.1 Ordinance Requirements

As demonstrated herein, the Project, as proposed, meets the intent and purpose of Article 19.00.

■

5.2.2 Project-Related Traffic and Access

As demonstrated by the TIS provided in Attachment 2, the Project is not expected to exceed the criteria for project vehicle trip generation established by the Planning Board under the Build program.

Vehicular access to the East Garage will be modified to support the Project. The existing west entrance/exit point on Ames Street and adjacent loading dock would both be eliminated to support construction of the Project. All automobile access to the East Garage would be accommodated from the existing entrance on Broadway. Egress would be provided via the existing Broadway exit – and supported with an additional, new egress-only drive for non-transient customers that would connect the garage back to Ames Street (just north of 5 Cambridge Center).

■

5.2.3 Impact to Adjacent Uses

Adjacent parcels (4 and 5 Cambridge Center) include predominately office uses with ground floor retail. The addition of a mixed use building with new residential supports the transformation of the Cambridge Center development into a 24-hour community. The ground-floor retail uses will provide additional services that support the adjacent office and other nearby lab, research, and hotel uses.

■

5.2.4 Health, Safety, and/or Welfare of Occupants and Public

The Project has been designed in conformance with the current state building code, including the Stretch Energy Code. Additionally, the Project will be operated in compliance with all health and safety regulations of the City of Cambridge.

■

5.2.5 Project-Related Impacts to the District or Adjoining Districts

The proposed residential and retail/restaurant uses are permitted by the zoning ordinance and are consistent with the uses of adjacent properties within the MXD District and with neighboring zoning districts.

■

5.2.6 Consistency with Urban Design Objectives

As proposed, the design of the new mixed use building and its integration with Ames Street and the existing buildings between Main Street and Broadway is consistent with the Urban Design Objectives addressed in Section 4, *Citywide Urban Design Objectives* of this application.

LEED 2009 for New Construction and Major Renovation

Project Checklist

Ames Street Residences

Date: August 04, 2014

Sustainable Sites — Possible Points: 26

Y	N	?			
Y			Prereq 1	Construction Activity Pollution Prevention	
1			Credit 1	Site Selection	1
5			Credit 2	Development Density and Community Connectivity	5
		1	Credit 3	Brownfield Redevelopment	1
6			Credit 4.1	Alternative Transportation—Public Transportation Access	6
	1		Credit 4.2	Alternative Transportation—Bicycle Storage and Changing Rooms	1
3			Credit 4.3	Alternative Transportation—Low-Emitting and Fuel-Efficient Vehicles	3
2			Credit 4.4	Alternative Transportation—Parking Capacity	2
	1		Credit 5.1	Site Development—Protect or Restore Habitat	1
		1	Credit 5.2	Site Development—Maximize Open Space	1
		1	Credit 6.1	Stormwater Design—Quantity Control	1
1			Credit 6.2	Stormwater Design—Quality Control	1
1			Credit 7.1	Heat Island Effect—Non-roof	1
		1	Credit 7.2	Heat Island Effect—Roof	1
	1		Credit 8	Light Pollution Reduction	1

Water Efficiency — Possible Points: 10

Y			Prereq 1	Water Use Reduction—20% Reduction	
2		2	Credit 1	Water Efficient Landscaping	2 to 4
	2		Credit 2	Innovative Wastewater Technologies	2
2	1	1	Credit 3	Water Use Reduction	2 to 4

Energy and Atmosphere — Possible Points: 35

Y			Prereq 1	Fundamental Commissioning of Building Energy Systems	
Y			Prereq 2	Minimum Energy Performance	
Y			Prereq 3	Fundamental Refrigerant Management	
2	15	2	Credit 1	Optimize Energy Performance	1 to 19
	7		Credit 2	On-Site Renewable Energy	1 to 7
2			Credit 3	Enhanced Commissioning	2
		2	Credit 4	Enhanced Refrigerant Management	2
1	2		Credit 5	Measurement and Verification	3
2			Credit 6	Green Power	2

Materials and Resources — Possible Points: 14

Y			Prereq 1	Storage and Collection of Recyclables	
	3		Credit 1.1	Building Reuse—Maintain Existing Walls, Floors, and Roof	1 to 3
	1		Credit 1.2	Building Reuse—Maintain 50% of Interior Non-Structural Elements	1
2			Credit 2	Construction Waste Management	1 to 2
	2		Credit 3	Materials Reuse	1 to 2

Materials and Resources, Continued

Y	N	?			
2			Credit 4	Recycled Content	1 to 2
1		1	Credit 5	Regional Materials	1 to 2
	1		Credit 6	Rapidly Renewable Materials	1
		1	Credit 7	Certified Wood	1

Indoor Environmental Quality — Possible Points: 15

Y			Prereq 1	Minimum Indoor Air Quality Performance	
Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control	
	1		Credit 1	Outdoor Air Delivery Monitoring	1
	1		Credit 2	Increased Ventilation	1
1			Credit 3.1	Construction IAQ Management Plan—During Construction	1
1			Credit 3.2	Construction IAQ Management Plan—Before Occupancy	1
1			Credit 4.1	Low-Emitting Materials—Adhesives and Sealants	1
1			Credit 4.2	Low-Emitting Materials—Paints and Coatings	1
1			Credit 4.3	Low-Emitting Materials—Flooring Systems	1
1			Credit 4.4	Low-Emitting Materials—Composite Wood and Agrifiber Products	1
1			Credit 5	Indoor Chemical and Pollutant Source Control	1
1			Credit 6.1	Controllability of Systems—Lighting	1
1			Credit 6.2	Controllability of Systems—Thermal Comfort	1
		1	Credit 7.1	Thermal Comfort—Design	1
	1		Credit 7.2	Thermal Comfort—Verification	1
	1		Credit 8.1	Daylight and Views—Daylight	1
1			Credit 8.2	Daylight and Views—Views	1

Innovation and Design Process — Possible Points: 6

1			Credit 1.1	Innovation in Design: Specific Title	1
1			Credit 1.2	Innovation in Design: Specific Title	1
1			Credit 1.3	Innovation in Design: Specific Title	1
1			Credit 1.4	Innovation in Design: Specific Title	1
1			Credit 1.5	Innovation in Design: Specific Title	1
1			Credit 2	LEED Accredited Professional	1

Regional Priority Credits — Possible Points: 4

1			Credit 1.1	Regional Priority: Specific Credit	1
		1	Credit 1.2	Regional Priority: Specific Credit	1
		1	Credit 1.3	Regional Priority: Specific Credit	1
		1	Credit 1.4	Regional Priority: Specific Credit	1

Total — Possible Points: 110

52	41	17		Total	Possible Points: 110

Certified 40 to 49 points Silver 50 to 59 points Gold 60 to 79 points Platinum 80 to 110

Source: FXFOWLE

Vanasse Hangen Brustlin, Inc.

Figure 6.1

Preliminary LEED Scorecard

Ames Street Residences
Cambridge, Massachusets

Attachment 1: Pedestrian Wind Study

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Guelph, Ontario, Canada
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Ames Street Residential

Cambridge, MA

Final Report

Pedestrian Wind Consultation

RWDI # 1401330
April 4, 2014

SUBMITTED TO

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Appendices

1. INTRODUCTION

Rowan Williams Davies & Irwin Inc. (RWDI) was retained by Boston Properties to consult on the pedestrian wind conditions for the proposed Ames Street Residential project in Cambridge, MA. The purpose of the study was to assess the wind environment around the development in terms of pedestrian wind comfort and safety. The achievement of this objective included the wind tunnel testing of a 1:300 scale model of the proposed development with existing, in-construction, and approved surroundings.

The photographs in Figure 1 show the test model in RWDI's boundary-layer wind tunnel. The proposed building is 280 ft high, consisting of a tower and several podium levels. The test model was constructed using the design information and drawings listed in Appendix A. This report summarizes the methodology of wind tunnel studies for pedestrian wind conditions, describes the RWDI pedestrian wind comfort and safety criteria, presents the local wind conditions and their effects on pedestrians and provides conceptual wind control measures, where necessary.

The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site, and reviewed by Boston Properties.

2. SUMMARY OF WIND CONDITIONS

The wind conditions around the proposed Ames Street Residential project are discussed in detail in Section 5 of this report and may be summarized as follows:

- Appropriate wind comfort conditions are expected along sidewalks throughout the year.
- Wind speeds are expected to be slightly higher than desired at the lower podium level terraces if areas of passive pedestrian activity are anticipated, and at building entrances. Wind mitigation measures are suggested.
- All grade and lower podium level locations are predicted to pass the criterion used to assess pedestrian wind safety. Four locations on the highest terrace level are expected to exceed this wind criterion; wind control measures are suggested to lower the wind and gust speeds in this area.

3. METHODOLOGY

As shown in Figure 1, the wind tunnel model included the proposed development and all relevant surrounding buildings and topography within a 1200 ft radius of the study site. The boundary-layer wind conditions beyond the modelled area were also simulated in RWDI's wind tunnel. The model was instrumented with 68 wind speed sensors to measure mean and gust wind speeds at a full-scale height of approximately 5 ft. These measurements were recorded for 36 equally incremented wind directions.

Wind statistics recorded at the Boston Logan International Airport between 1983 and 2013 were analyzed for the Summer (May through October) and Winter (November through April) seasons. Figure 2 graphically depicts the directional distributions of wind frequencies and speeds for the two seasons. Winds from the south-southwest through north-northwest directions are predominant in both the summer and winter as indicated by the wind roses. Strong winds of a mean speed greater than 20 mph measured at the airport (at an anemometer height of 30 ft) occur more often in the winter (12.5%) than in the summer (4.8%).

Wind statistics from the Boston Logan International Airport were combined with the wind tunnel data in order to predict the frequency of occurrence of full-scale wind speeds. The full-scale wind predictions were then compared with the RWDI criteria for pedestrian comfort and safety.

4. EXPLANATION OF CRITERIA

The RWDI pedestrian wind criteria are used in the current study. These criteria have been developed by RWDI through research and consulting practice since 1974 (References 1 through 6). They have also been widely accepted by municipal authorities as well as by the building design and city planning community.

RWDI Pedestrian Wind Criteria

Comfort Category	GEM Speed (mph)	Description
Sitting	≤ 6	Calm or light breezes desired for outdoor restaurants and seating areas where one can read a paper without having it blown away
Standing	≤ 8	Gentle breezes suitable for main building entrances and bus stops
Strolling	≤ 10	Moderate winds that would be appropriate for window shopping and strolling along a downtown street, plaza or park
Walking	≤ 12	Relatively high speeds that can be tolerated if one's objective is to walk, run or cycle without lingering
Uncomfortable	> 12	Strong winds of this magnitude are considered a nuisance for most activities, and wind mitigation is typically recommended
Notes: (1) Gust Equivalent Mean (GEM) speed = *max*(mean speed, gust speed/1.85); and (2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 6:00 and 23:00.		
Safety Criterion	**Gust Speed (mph)**	**Description**
Exceeded	> 56	Excessive gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.
Note: Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day.		

A few additional comments are provided below to further explain the wind criteria and their applications.

- Both mean and gust speeds can affect pedestrian comfort and their combined effect is typically quantified by a Gust Equivalent Mean (GEM) speed, with a gust factor of 1.85 (References 1, 5, 7 and 8).

- Instead of standard four seasons, two periods of summer (May to October) and winter (November to April) are adopted in the wind analysis, because in a moderate or cold climate such as that found in Cambridge, there are distinct differences in pedestrian outdoor behaviours between these two time periods.

- Nightly hours between midnight and 5 o'clock in the morning are excluded from the wind analysis for wind comfort since limited usage of outdoor spaces is anticipated.

- A 20% exceedance is used in these criteria to determine the comfort category, which suggests that wind speeds would be comfortable for the corresponding activity at least 80% of the time or four out of five days.

- Only gust winds need to be considered in the wind safety criterion. These are usually rare events, but deserve special attention in city planning and building design due to their potential safety impact on pedestrians.

- These criteria for wind forces represent average wind tolerance. They are sometimes subjective and regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. can also affect people's perception of the wind climate. Comparisons of wind speeds for different building configurations are the most objective way in assessing local pedestrian wind conditions.

5. PREDICTED WIND CONDITIONS

Table 1, located in the Tables section of this report, presents the predicted wind comfort and safety conditions for the proposed building configuration. These conditions are graphically depicted on a site plan in Figures 3 through 5. The following is a detailed discussion of the suitability of the predicted wind comfort and safety conditions for the anticipated pedestrian use of each area.

In our discussion of anticipated wind conditions, reference is made to the following generalized wind flow. Tall buildings tend to intercept the stronger winds at higher elevations and redirect them to the ground level (see Image 1). Such a *Downwashing Flow* is often the main cause for wind accelerations around large buildings at the pedestrian level. If this building/wind combination occurs for prevailing winds, there is a greater potential for increased wind activity. An effective measure to reduce the direct impact of the downwashing flow is to include a large podium around the tower (see Image 2). This will cause the wind to deflect above grade level, lowering wind speeds at grade level but retaining the higher wind speeds at podium level.

Image 1 – Downwashing Flow

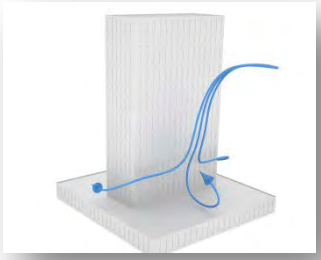


Image 2 – Large Podium for Wind Control

5.1 Grade Level (Locations 1 through 47)

Wind conditions comfortable for walking or strolling are appropriate for sidewalks. Lower wind speeds conducive to standing are preferred at main entrances where pedestrians are apt to linger.

Wind conditions along the sidewalks are generally expected to be comfortable for strolling or better during the summer (Figure 3) and comfortable for walking or better during the winter (Figure 4). These conditions are suitable for the intended pedestrian usage of the area.

Lower wind speeds are preferred at building entrances. To achieve a level comfortable for standing throughout the year, building entrances may be recessed or a vestibule included to provide pedestrians with a place to wait during windy conditions. Alternatively, coniferous landscaping or wind screens may be added perpendicular to the building façade. Any wind screens or landscaping used should be at least 7 ft high and approximately 20 – 30% porous. Large canopies can also be installed above the entrances for wind and rain protection. Examples of wind control solutions near entrances are shown in Images 3, 4 and 5.

Image 3 – Examples of recessed entrances

Image 4 – Examples of landscaping and wind screens near entrances

Image 5 – Examples of canopies

5.2 Podium and Roof Level Terraces (Locations 48 through 62)

It is generally desirable for wind conditions on terraces to be comfortable for sitting more than 80% of the time in the summer. During the winter, the area would not be used frequently and increased wind activity would be considered appropriate.

During the summer, wind conditions on the lower podium terraces are expected to be comfortable for standing or strolling (Locations 48 through 56 in Figure 3). The higher wind speeds are due to winds from the southwest and south-southwest downwashing off the tower façades and accelerating around its corners. These conditions are suitable for active pedestrian activities, but lower wind speeds may be desired around seating areas. If it is desired to lower these wind speeds, it is recommended to increase parapet heights to at least 7 ft using an approximately 20 – 30% porous material in the placements shown in Image 6a. Localized landscaping, such as planting, trellises and umbrellas, near and above seating areas would also be beneficial. Examples of these wind control measures are shown in Images 7, 8, and 9.

On the higher roof level terrace, some uncomfortable conditions are expected (Locations 57, 58, 59 and 61 in Figure 3), in addition to exceedances of the safety criterion at four locations (Locations 57, 58, 61 and 62 in Figure 5). These conditions are not suitable for pedestrian use, and particular attention should

be paid to reducing the wind speeds on this level, if frequent use of the area is anticipated. The parapets on the south, west and north edges of the terrace should be raised to a height of at least 7 ft and be made of an approximately 20 – 30% porous material, as shown in Image 6b. In addition, localized landscaping and screen partitions around seating areas will help reduce horizontal wind flows.

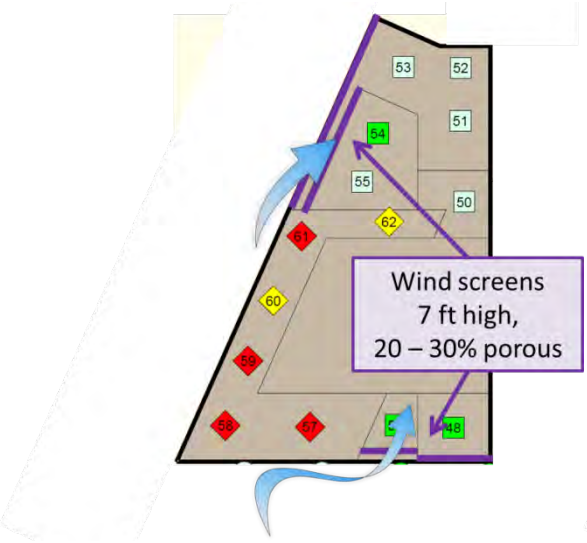


Image 6a – Optional wind screen placements for lower terraces

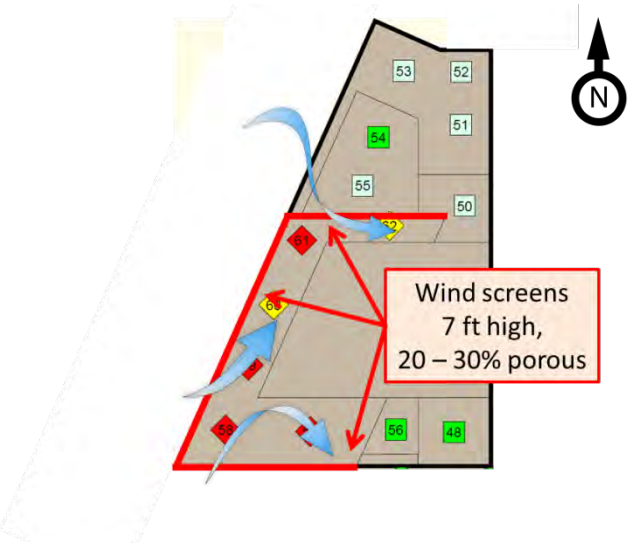


Image 6b – Recommended wind screen placements for upper terraces

Image 7 – Examples of porous parapets

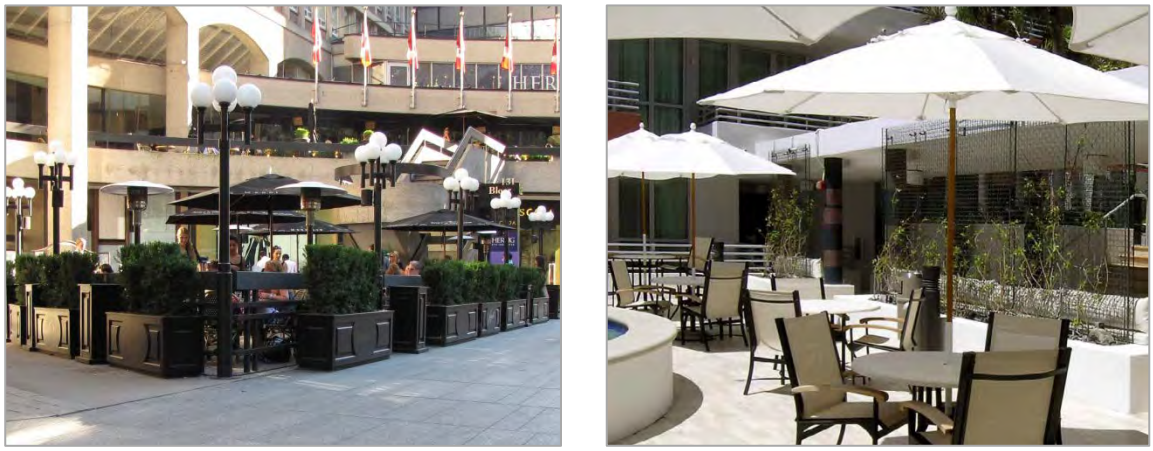


Image 8 – Examples of landscaping around seating areas

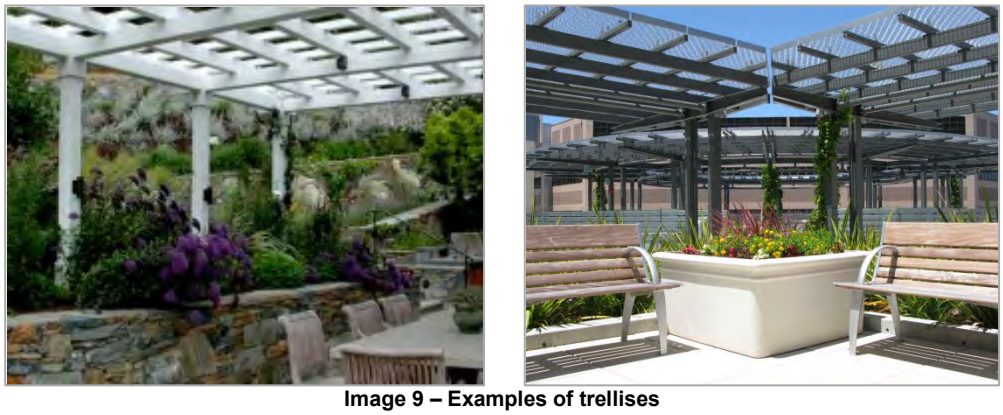


Image 9 – Examples of trellises

5.3 Neighboring Rooftop Garden (Locations 63 through 68)

During the summer on a rooftop garden, it is generally desirable for wind conditions to be comfortable for sitting near benches and seating areas, and comfortable for standing or strolling near pathways. During the winter, the area would not be used frequently and increased wind activity would be considered appropriate.

On the rooftop garden to the east of the proposed building, conditions comfortable for strolling and walking are expected during the summer. These wind speeds are generally due to exposure to winds from the south-southwest, and the higher wind speeds at Locations 65 and 68 on the east side of the garden are also due to strong winds from the east accelerating around the tower to the east of the garden. If it is desired to lower the wind speeds in this area, tall, porous parapets are recommended along the northeast and southwest edges of the garden, as shown in Image 10. Examples are shown in Image 7.

Note that there is extensive landscaping currently existing in the rooftop garden and renovations have been proposed as part of the Cambridge Center redevelopment. These were not modelled in the current wind tunnel testing. If desired, further wind tunnel studies can be conducted to quantify the wind conditions and to develop wind control strategies for this and other pedestrian areas.

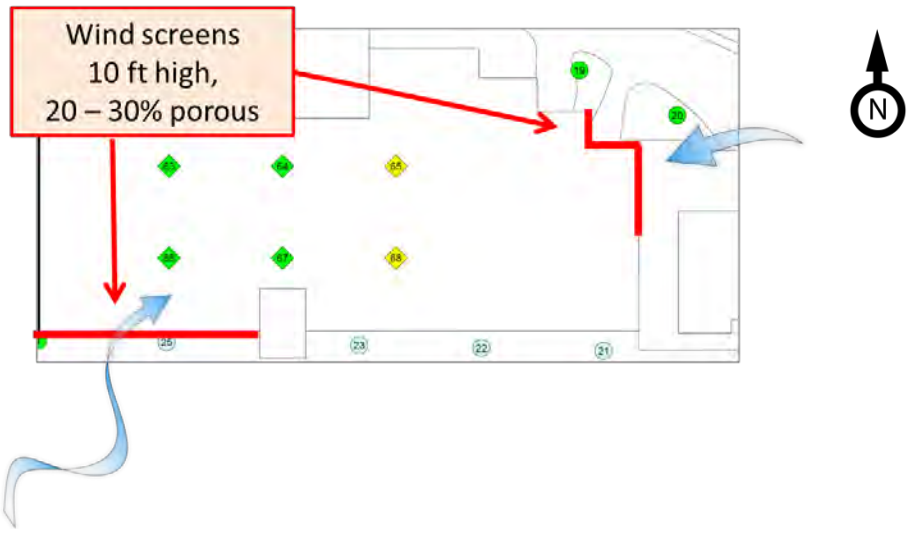


Image 10 – Wind screen placements for rooftop garden

6. APPLICABILITY

The wind conditions presented in this report pertain to the proposed Ames Street Residential development as detailed in the architectural design drawings listed in Appendix A. Should there be any design changes that deviate from this list of drawings, the wind condition predictions presented may change. Therefore, if changes in the design are made, it is recommended that RWDI be contacted and requested to review their potential effects on wind conditions.

7. REFERENCES

1) ASCE Task Committee on Outdoor Human Comfort (2004). *Outdoor Human Comfort and Its Assessment*, 68 pages, American Society of Civil Engineers, Reston, Virginia, USA.

2) Williams, C.J., Hunter, M.A. and Waechter, W.F. (1990). "Criteria for Assessing the Pedestrian Wind Environment," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.36, pp.811-815.

3) Williams, C.J., Soligo M.J. and Cote, J. (1992). "A Discussion of the Components for a Comprehensive Pedestrian Level Comfort Criteria," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.41-44, pp.2389-2390.

4) Soligo, M.J., Irwin, P.A., and Williams, C.J. (1993). "Pedestrian Comfort Including Wind and Thermal Effects," *Third Asia-Pacific Symposium on Wind Engineering*, Hong Kong.

5) Soligo, M.J., Irwin, P.A., Williams, C.J. and Schuyler, G.D. (1998). "A Comprehensive Assessment of Pedestrian Comfort Including Thermal Effects," *Journal of Wind Engineering and Industrial Aerodynamics*, Vol.77&78, pp.753-766.

6) Williams, C.J., Wu, H., Waechter, W.F. and Baker, H.A. (1999). "Experiences with Remedial Solutions to Control Pedestrian Wind Problems," *Tenth International Conference on Wind Engineering*, Copenhagen, Denmark.

7) Lawson, T.V. (1973). "Wind Environment of Buildings: A Logical Approach to the Establishment of Criteria", *Report No. TVL 7321*, Department of Aeronautic Engineering, University of Bristol, Bristol, England.

8) Durgin, F. H. (1997). "Pedestrian Level Wind Criteria Using the Equivalent average", *Journal of Wind Engineering and Industrial Aerodynamics*, Vol. 66, pp. 215-226.

TABLES

Table 1: Pedestrian Wind Comfort and Safety Conditions

		Wind Comfort (20% Seasonal Exceedance)				Wind Safety (0.1% Exceedance)	
		Summer		Winter		Annual	
Location	Configuration	Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Proposed	9	Strolling	9	Strolling	39	Pass
2	Proposed	9	Strolling	10	Strolling	39	Pass
3	Proposed	8	Standing	9	Strolling	36	Pass
4	Proposed	7	Standing	8	Standing	32	Pass
5	Proposed	11	Walking	12	Walking	48	Pass
6	Proposed	9	Strolling	11	Walking	43	Pass
7	Proposed	9	Strolling	11	Walking	42	Pass
8	Proposed	10	Strolling	12	Walking	44	Pass
9	Proposed	9	Strolling	11	Walking	38	Pass
10	Proposed	9	Strolling	10	Strolling	37	Pass
11	Proposed	10	Strolling	12	Walking	42	Pass
12	Proposed	7	Standing	9	Strolling	33	Pass
13	Proposed	10	Strolling	11	Walking	42	Pass
14	Proposed	9	Strolling	10	Strolling	42	Pass
15	Proposed	8	Standing	10	Strolling	39	Pass
16	Proposed	8	Standing	10	Strolling	38	Pass
17	Proposed	8	Standing	9	Strolling	39	Pass
18	Proposed	7	Standing	9	Strolling	37	Pass
19	Proposed	9	Strolling	10	Strolling	40	Pass
20	Proposed	9	Strolling	10	Strolling	41	Pass
21	Proposed	8	Standing	9	Strolling	37	Pass
22	Proposed	8	Standing	9	Strolling	40	Pass
23	Proposed	8	Standing	8	Standing	36	Pass
24	Proposed	8	Standing	8	Standing	38	Pass

Seasons
Summer = May to October
Winter = November to April

Hours
6:00 to 23:00 for Comfort
0:00 to 23:00 for Safety

Configuration
Proposed = with the proposed development

Wind Comfort Category
(20% Seasonal Exceedance)

≤ 6 mph	Sitting
7 to 8	Standing
9 to 10	Strolling
11 to 12	Walking
> 12 mph	Uncomfortable

Wind Safety Category
(0.1% Annual Exceedance)

≤ 56 mph	Pass
> 56 mph	Exceeded

Table 1: Pedestrian Wind Comfort and Safety Conditions

		Wind Comfort (20% Seasonal Exceedance)				Wind Safety (0.1% Exceedance)	
		Summer		Winter		Annual	
Location	Configuration	Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
25	Proposed	8	Standing	8	Standing	37	Pass
26	Proposed	8	Standing	8	Standing	36	Pass
27	Proposed	9	Strolling	9	Strolling	37	Pass
28	Proposed	9	Strolling	10	Strolling	38	Pass
29	Proposed	9	Strolling	10	Strolling	38	Pass
30	Proposed	9	Strolling	10	Strolling	38	Pass
31	Proposed	9	Strolling	11	Walking	39	Pass
32	Proposed	9	Strolling	11	Walking	40	Pass
33	Proposed	9	Strolling	10	Strolling	38	Pass
34	Proposed	10	Strolling	11	Walking	41	Pass
35	Proposed	8	Standing	8	Standing	35	Pass
36	Proposed	8	Standing	8	Standing	35	Pass
37	Proposed	9	Strolling	9	Strolling	43	Pass
38	Proposed	9	Strolling	10	Strolling	41	Pass
39	Proposed	10	Strolling	10	Strolling	41	Pass
40	Proposed	10	Strolling	11	Walking	45	Pass
41	Proposed	8	Standing	10	Strolling	38	Pass
42	Proposed	8	Standing	9	Strolling	36	Pass
43	Proposed	10	Strolling	12	Walking	48	Pass
44	Proposed	10	Strolling	10	Strolling	43	Pass
45	Proposed	8	Standing	9	Strolling	38	Pass
46	Proposed	9	Strolling	11	Walking	41	Pass
47	Proposed	7	Standing	9	Strolling	33	Pass
48	Proposed	9	Strolling	10	Strolling	41	Pass

Seasons
Summer = May to October
Winter = November to April

Hours
6:00 to 23:00 for Comfort
0:00 to 23:00 for Safety

Configuration
Proposed = with the proposed development

Wind Comfort Category
(20% Seasonal Exceedance)

≤ 6 mph	Sitting
7 to 8	Standing
9 to 10	Strolling
11 to 12	Walking
> 12 mph	Uncomfortable

Wind Safety Category
(0.1% Annual Exceedance)

≤ 56 mph	Pass
> 56 mph	Exceeded

Table 1: Pedestrian Wind Comfort and Safety Conditions

		Wind Comfort (20% Seasonal Exceedance)				Wind Safety (0.1% Exceedance)	
		Summer		Winter		Annual	
Location	Configuration	Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
49	Proposed	10	Strolling	12	Walking	45	Pass
50	Proposed	8	Standing	8	Standing	39	Pass
51	Proposed	7	Standing	9	Strolling	34	Pass
52	Proposed	8	Standing	9	Strolling	36	Pass
53	Proposed	7	Standing	9	Strolling	35	Pass
54	Proposed	9	Strolling	10	Strolling	47	Pass
55	Proposed	7	Standing	9	Strolling	34	Pass
56	Proposed	9	Strolling	9	Strolling	51	Pass
57	Proposed	14	Uncomfortable	15	Uncomfortable	63	Exceeded
58	Proposed	15	Uncomfortable	18	Uncomfortable	68	Exceeded
59	Proposed	13	Uncomfortable	15	Uncomfortable	54	Pass
60	Proposed	12	Walking	14	Uncomfortable	51	Pass
61	Proposed	15	Uncomfortable	17	Uncomfortable	65	Exceeded
62	Proposed	11	Walking	14	Uncomfortable	60	Exceeded
63	Proposed	9	Strolling	10	Strolling	45	Pass
64	Proposed	9	Strolling	10	Strolling	42	Pass
65	Proposed	11	Walking	12	Walking	49	Pass
66	Proposed	10	Strolling	11	Walking	47	Pass
67	Proposed	10	Strolling	11	Walking	50	Pass
68	Proposed	11	Walking	12	Walking	49	Pass

Seasons
Summer = May to October
Winter = November to April

Hours
6:00 to 23:00 for Comfort
0:00 to 23:00 for Safety

Configuration
Proposed = with the proposed development

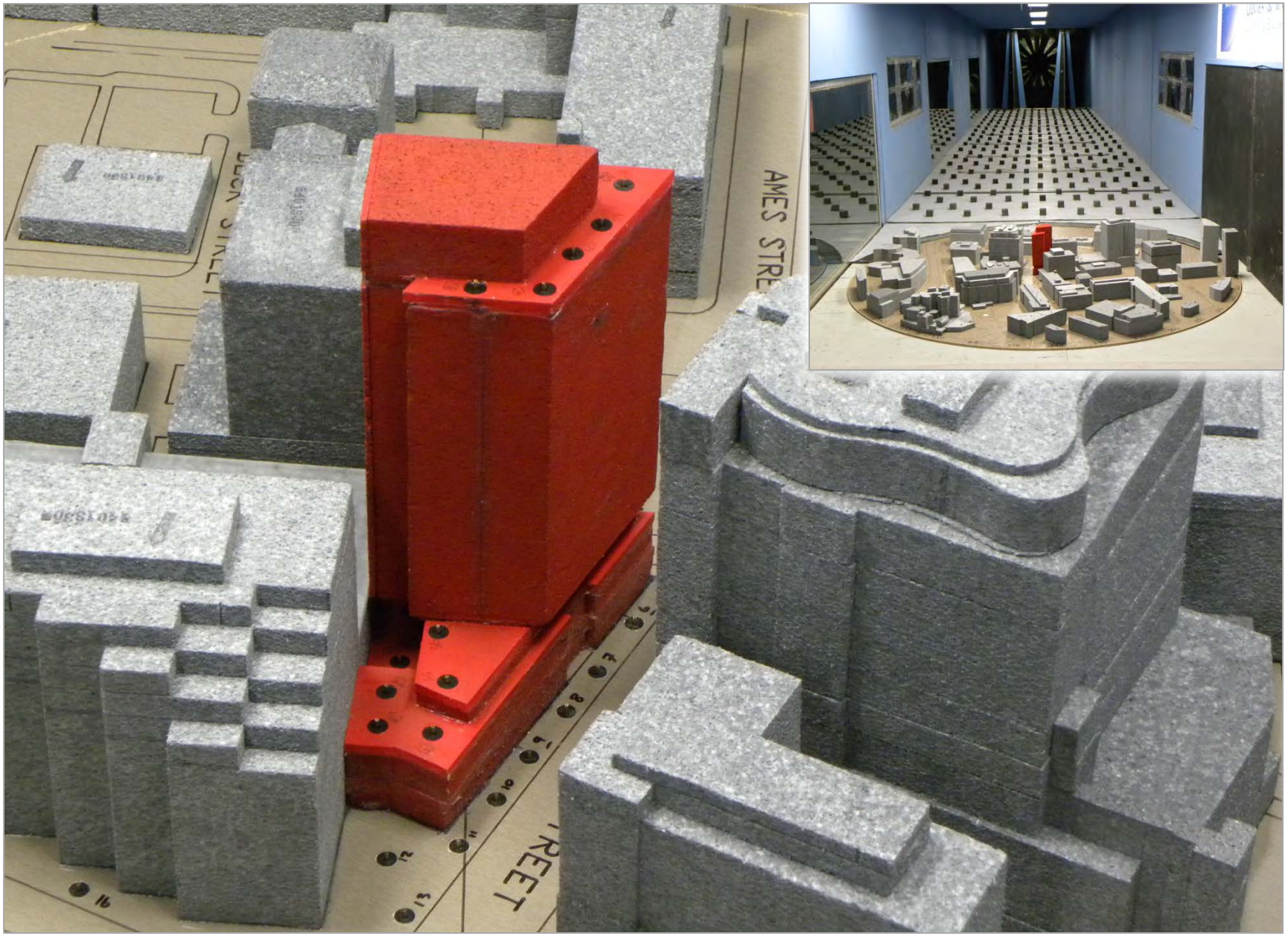
Wind Comfort Category
(20% Seasonal Exceedance)

≤ 6 mph	Sitting
7 to 8	Standing
9 to 10	Strolling
11 to 12	Walking
> 12 mph	Uncomfortable

Wind Safety Category
(0.1% Annual Exceedance)

≤ 56 mph	Pass
> 56 mph	Exceeded

FIGURES



Wind Tunnel Study Model
Proposed Configuration

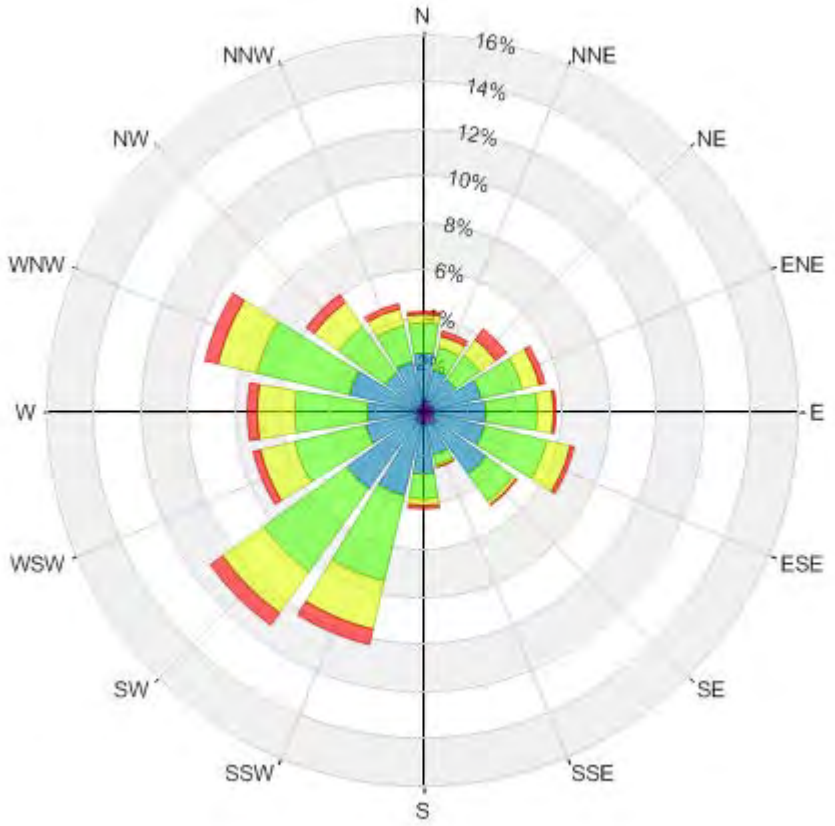
Figure No. 1

Ames Street Residential – Cambridge, MA

Project #1401330

Date: March 20, 2014

RWDI



Summer
(May - October)

Winter
(November - April)

Wind Speed (mph)	Probability (%) Summer	Winter
Calm	2.1	1.8
1-5	7.0	5.3
6-10	34.8	26.5
11-15	35.6	32.4
16-20	15.8	21.5
>20	4.8	12.5

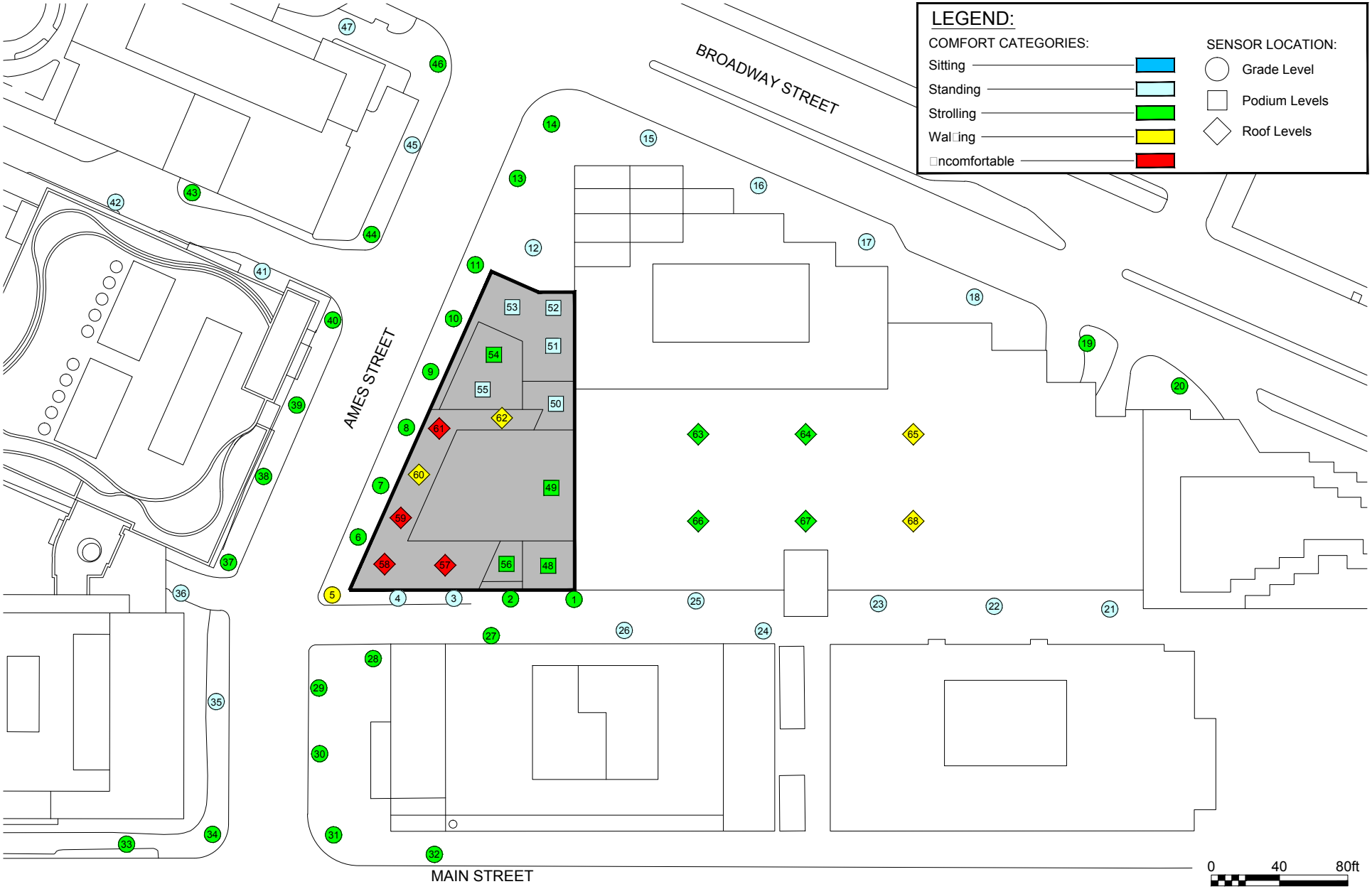
Directional Distribution (%) of Winds (Blowing From)
Boston Logan International Airport (1983 - 2013)

Figure No. 2

Ames Street Residential – Cambridge, MA

Project #1401330

Date: April 04, 2014



Pedestrian Wind Comfort Conditions - Proposed

Summer (May to October, 6:00 to 23:00)

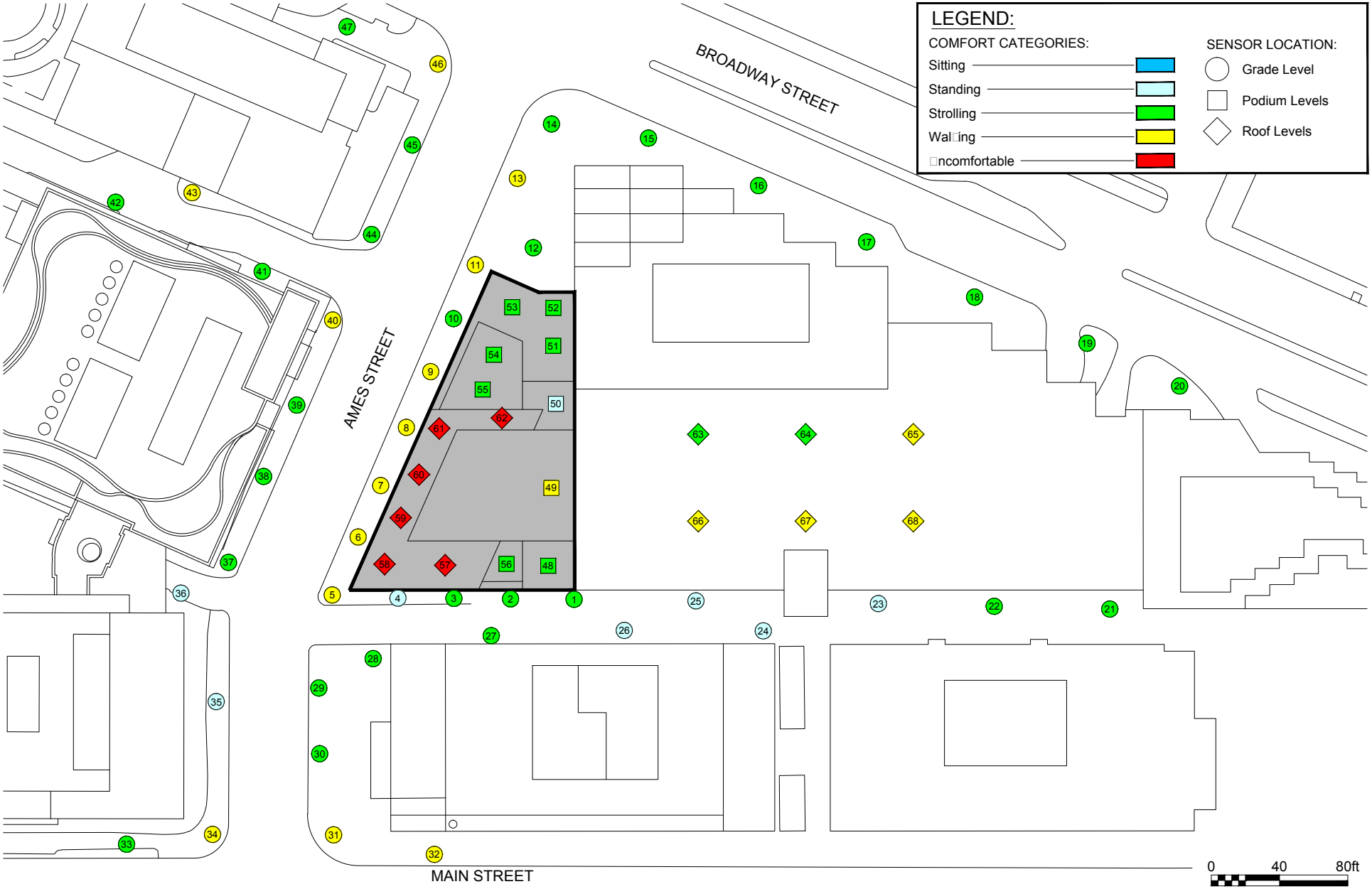
True North

Ames Street Residential - Cambridge, MA

Project #1401330

Drawn by: SMR	Figure: 3
Approx. Scale:	1"=80'
Date Revised:	Mar. 20, 2014

RWDI



Pedestrian Wind Comfort Conditions - Proposed

Winter (November to April, 6:00 to 23:00)

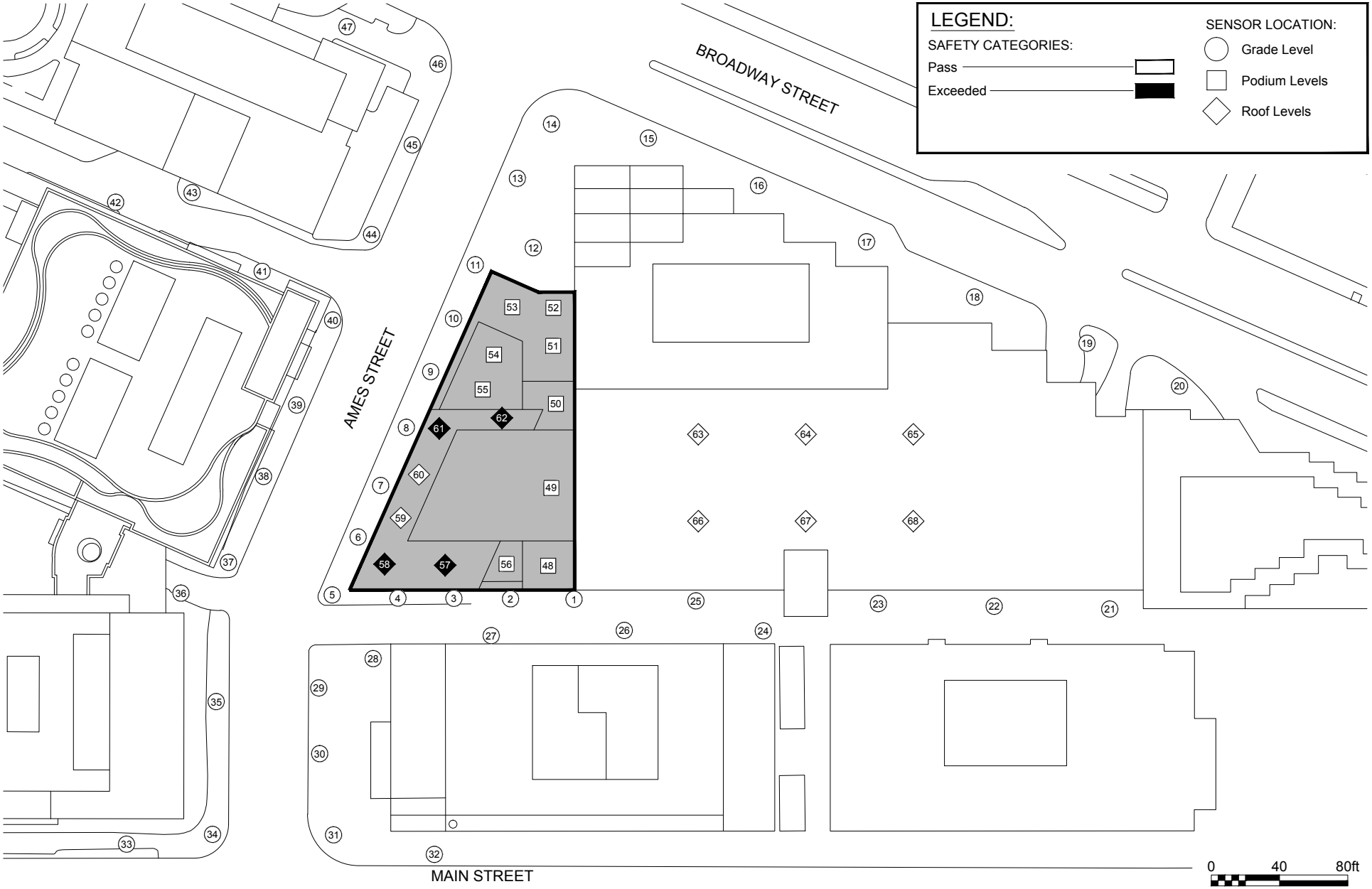
True North

Ames Street Residential - Cambridge, MA

Project #1401330

Drawn by:	SMR	Figure:	4
Approx. Scale:			1"=80'
Date Revised:			Mar. 20, 2014

RWDI



Pedestrian Wind Safety Conditions - Proposed

Annual (January to December, 0:00 to 23:00)

True North

Ames Street Residential - Cambridge, MA

Project #1401330

Drawn by:	SMR	Figure:	5
Approx. Scale:			1"=80'
Date Revised:			Mar. 20, 2014

RWDI