VASSAR STREET UNDERGRADUATE RESIDENCE HALL

MICHAEL MALTZAN ARCHITECTURE | DIMELLA SHAFFER

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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:	121-169 Vassar Street
Zoning District:	Special District 6
Applicant Name:	Massachusetts Institute of Technology
Applicant Address:	77 Massachusetts Ave., NW23-100, Cambridge MA 02139
Contact Information:	617-452-2410 (Telephone #) kbrown@mit.edu (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.*

Article 19, Section 19.20 Project Review Special Permit

Article 6, Section 6.43.5 (b)

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

Volume I - Project Review Special Permit Application
- Section One - Application Forms
- Section Two - Project Narratives
- Section Three - Project Certifications

Volume II - Vassar Street Undergraduate Residence Hall

Signature of Applicant: Kelley Brown

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

DIMENSIONAL FORM

Project Address: 121-169 Vassar Street **Application Date:**

	Existing	Allowed or Required (max/min)	Proposed	Permitted
Lot Area (sq ft)	765,106	5,000	765,106	
Lot Width (ft)		50	>50	
Total Gross Floor Area (sq ft)	1,011,677	2,102,877	1,167,655	
Residential Base				
Non-Residential Base				
Inclusionary Housing Bonus				
Total Floor Area Ratio	1.32	1.75-3.0	1.53	
Residential Base				
Non-Residential Base				
Inclusionary Housing Bonus				
Total Dwelling Units	NA	NA	NA	
Base Units				
Inclusionary Bonus Units				
Base Lot Area / Unit (sq ft)				
Total Lot Area / Unit (sq ft)				
Building Height(s) (ft)	42.1	100	64 ft	
Front Yard Setback (ft)	NA	NA	NA	
Side Yard Setback (ft)	NA	NA	NA	
Side Yard Setback (ft)	NA	NA	NA	
Rear Yard Setback (ft)	NA	NA	NA	
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	410	38	Per 6.22.1(a)(3)	
Long-Term Bicycle Parking	NA	243	243	
Short-Term Bicycle Parking	NA	33	34	
Loading Bays	NA	2	2	

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

per 5.13, distance between buildings on multi-building parcel calculations:
Proposed Building 121-169 Vassar (63.6 ft) + W59 (33.5 ft) = 97.1 ft / 6 = 16.2 ft
Proposed Building 121-169 Vassar (63.6 ft) + W45 (42.1 ft) = 105.7 ft/ 6 = 17.6 ft

OWNERSHIP CERTIFICATE

Project Address: 121-169 Vassar Street **Application Date:** Nov. 8, 2017

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

I hereby authorize the following Applicant: Kelley Brown

at the following address: Office of Campus Planning, MIT, 77 Massachusetts Ave, NW23-100, Cambridge MA 02139

to apply for a special permit for: Massachusetts Institute of Technology

on premises located at: 121-169 Vassar Street

for which the record title stands in the name of: Massachusetts Institute of Technology

whose address is: 77 Massachusetts Ave., Cambridge MA 02139

by a deed duly recorded in the: **(See attached title references)**

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 Suffolk

The above named Richard L. Amster, Jr. personally appeared before me,

on the month, day and year October 30, 2017 and made oath that the above statement is true.

Notary: D. Kelley Brown

My Commission expires: December 16, 2022

Title References for 121-169 Vassar Street

<u>121 Vassar Street</u>:

(a) Registered Land:

Deed from Marie C. Davis to MIT dated 6/13/54, filed as Document No. 282978
Certificate of Title No. 82160
Land Court Plan No. 418E shows locus as Lot A-3

(b) Recorded Land (Subsequently Registered):

Deed from Leon B. Newman, Trustee, to MIT dated 10/29/1962, recorded in Book 10155, Page 129 for a 133 sq. ft. parcel of land which was later registered
Original Certificate of Title No. 135831
Land as registered shown on Land Court Plan No. 32271A

<u>165-191 Vassar Street</u>:

(a) Recorded and Registered Land:

Deed from Watriss and Stoddard, Trustees, to MIT dated 10/15/73, recorded in Book 12634, Page 591 and filed as Document No. 522601
Deed includes:

(i) Lot B on Plan recorded in Book 3869 End
(ii) 2661 sq. ft. parcel originally from John E. Cain (see deed into Trustees recorded at Book 12475, Page 286)
(iii) Registered Parcel A-1 on Land Court Plan 418C
(iv) Registered Parcel A-2 on LC Plan 418 E

For title to registered land parcels see Certificate of Title No. 143782

Project Address: 121-169 Vassar Street **Application Date:**

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): 155,978	× $0.10 = 15,597.80	
Flood Plain Special Permit	Enter $1,000.00 if applicable: 0	
Other Special Permit	Enter $150.00 if no other fee is applicable:	
TOTAL SPECIAL PERMIT FEE	**Enter Larger of the Above Amounts:**	15,597.80

2 PROJECT NARRATIVES

I. INTRODUCTION & PROJECT OVERVIEW

MIT is proposing to construct a new undergraduate residence at 121 and 169 Vassar Street west of Massachusetts Avenue on the MIT campus in Cambridge MA. MIT currently houses 82% of MIT's undergraduate students in Cambridge. An additional 16% of MIT's undergraduates are housed in fraternities, sororities, and independent living groups in Boston and Brookline. The new residence is a critical part of the Institute's program to promote a thriving residential life experience for its undergraduates.

The new residence will have 450 new dormitory beds, 12 apartments for graduate resident tutors, and 4 apartments to accommodate a faculty Head-of-House, a faculty Associate Head-of-House, an Area Director and a Visiting Scholar. This new residential community will provide sufficient bed capacity to allow for the renovation of some of MIT's existing undergraduate residences.

The scale of the project (156,000 SF of Gross Floor Area) requires a Project Review Special Permit (Section 19.20). As an educational university project that relocates less than 250 parking spaces and does not create more than 150 new parking spaces, the proposed project does not have traffic impact that would require a traffic study as described in Section 19.21.1.

The loading for trash, recycling and food service for the dining hall and access of the fire truck lane across the north of the site requires a 30' curbcut and driveway to the loading area on the eastern end of the site. The project is located in Special District 6 (SD-6), in which the requirements for a Res C-3 zone are applicable, unless otherwise specified. The proposed driveway is in excess of the 20' limit specified in Section 6.43.3 (a) for a residential district. As a result, the proposed project requires a special permit under Section 6.43.5 (b). The Planning Board may grant this special permit according to Section 10.45.

Site

Located on Vassar Street at a central juncture of MIT's campus, the project site will serve as an area of increased connectivity between the Northwest campus and the open space and residential halls to the south. Existing buildings on site include a parking garage (W45) to be demolished and a former parking lot.

Urban and architectural responses to the site are defined by the shape of the site and neighboring conditions. The site is approximately 788' long and ranges between approximately 90' and 100' wide. The Metropolitan Warehouse Building (W41) is located to the east. A 25' wide utility easement at the eastern end of the site, as well as potential future uses of the Warehouse Building, support the concept of using this end of the site as a loading and vehicle turning area that serves both the new dormitory and the existing Warehouse building. The Heinz Building (W59) is located to the west of the site. At this west end, an existing pedestrian path traverses the short dimension of the site, connecting Pacific Street at the northwest and Vassar Street to the southeast. The urban design intent is to develop this route across the site, improving and making more prominent its role in providing a pedestrian and cyclist connection to the northwest of the campus, and enabling the western end of the site as a new gateway plaza. Siting strategies, view corridors and ground floor programming respond to these larger urban design objectives.

Analysis of site context and material adds layers to the understanding of place. The site is framed by two very different but equally important edges. Vassar Street was transformed from an overly wide industrial strip into a pedestrian- and bicycle-friendly institutional artery that constitutes part of the ring of student residences on MIT's western campus, with significant campus buildings and the Institute's playing fields. Running parallel on the opposite side of the site are the MBTA railway tracks, representing an unrefined urban strip of

industrial fabric. In developing the design, consideration has been given to the contrast between these adjacent edges, along with their specific spatial qualities, textures, and materials.

The architectural concept incorporates a series of heterogeneous masses emerging from a spine running along the northern edge of the site. This creates relief and variety in the Vassar street wall. The design incorporates a public entry forecourt and a private courtyard for the use by the student residents. The fenestration of the Vassar Street elevation communicates variety in the internal arrangement and program, contrasting the regularity of the cellular dorm rooms against the more localized and expressive fenestration of common spaces and faculty apartments. At the Vassar Street level, the design presents a diverse array of materials, mediated views into the building and courtyards, and provides visual interest and connection for the pedestrian.

Like the Vassar facade, the north facade expresses the interior of the building, through a series of more abstract graphic and sculptural elements. The north has a more regular façade that achieves sculptural relief through articulated stair cores, cantilevered massing and the volumetric expression of the linear bicycle storage enclosure. These elements are reinforced by the use of contrasting brick colors and patterning. Strong vertical elements standing against the predominantly horizontal form refer to the legacy of smokestacks in the immediate industrial context.

The west end of the site opens into a plaza where the view corridor from Pacific Street to downtown Boston is apparent. The connection to the NW sector of campus and Cambridgeport can be made physically and visually. The height of the building reinforces and complements the scale of the neighboring buildings.

II. CONFORMANCE WITH CAMBRIDGE ZONING ORDINANCE

The project site is in the SD-6 district, which defers to the requirements of the Residence C-3 unless otherwise modified by SD-6.

The institutional educational residence hall use (Section 4.33 b.7) is allowed in SD-6.

The project site is part of a multi-building lot of 765,506 SF, in excess of the minimum 5,000 SF lot size and is more than 50 feet wide. Portions of this lot are in SD-6, SD-7 and SD-11. The total built capacity allowed on the lot is 2,102,877 SF. The existing buildings total 1,011,677 SF. This allows for approximately 1.1 million additional SF of buildings on the lot

The proposed building is 155,978 SF of GFA, within the allowed limit.

There are no yard requirements in SD-6 and the minimum private open space requirement applies only to residential uses, not institutional uses.

The maximum building height is 64 feet, below the 100-foot limit in SD-6.

The project has 2 loading bays, in compliance with the 2 required for a building of this size and type. The parking requirement is one parking space for every 12 beds. This results in 38 parking spaces. These will be provided for in the campus-wide inventory, per Section 6.22.1(a)(3).

The project has 34 short-term bicycle parking spaces and 243 long-term spaces, both in excess of the required minimums under Section 6.100.

The specific permits being sought in this application are:

- Article 19, Project Review. The specific criteria and the responsiveness of the project to each of the applicable criteria are included in the urban design, infrastructure, noise, environmental and access and circulation narratives.
- Section 6.43.5(b) – This section allows the Board to permit modification of the curb cut width limit if it "determines that an increased curb cut width would facilitate traffic and safety." The wider driveway is necessary to safely accommodate commercial trucks that will be accessing the loading docks and fire trucks that would be accessing the fire lane along the north of the site in an emergency. A smaller driveway could result in conflicts between vehicles exiting and entering at the same time and would result in commercial trucks crossing the curb as they enter the loading area. Conflicts at the entry could also result in turns being interrupted before vehicles are able to leave the roadway.

III. CONFORMANCE WITH SPECIAL PERMIT CRITERIA

The general criteria of the General Special Permit Criteria (Section 10.43) will be met by the project. Traffic generated or patterns of access or egress are not anticipated to cause congestion, hazard, or substantial change in the established neighborhood character. The project is 2500 feet from Massachusetts Avenue. It replaces a 372-car parking garage and a 38-vehicle Grounds Services facility with a facility that has no parking. This will be a net improvement to the neighborhood by being more compatible with all the surrounding academic, service office and student life uses. The continued operation and adjacent MIT campus buildings' use patterns will not be adversely affected by the project's proposed use as a residential dormitory building. No anticipated nuisances or hazards would be created by the pedestrian-oriented project that would be a detriment to the health, safety, and/or welfare of the occupants of the proposed use or citizens of the City. Finally, the project is not anticipated to impair the integrity of the district, or adjoining districts, all of which are dominated by large institutional or commercial buildings. Please refer to Section IV of this document for the project's Urban Design narrative.

IV. URBAN DESIGN NARRATIVE

Narrative and Urban Design Narrative (Section 19.30).

Describe how the project meets the criteria for approval of the specific permits sought, which may include criteria specific to the zoning district or area of planning concern. Preferred format is to list all applicable criteria, as set forth in the zoning, and respond to each individually. Comment specifically on Design/ location of proposed mechanical equipment, location and operation of trash storage, removal systems, loading and operation of loading facilities, measures taken to minimize negative visual and noise impacts of facilities on abutters, and building and site design provisions to accommodate pedestrian, bicycle and transit access.

SECTION 19.31

New projects should be responsive to the existing or anticipated pattern of development. Indicators include:

(1) Heights and setbacks provide suitable transition to abutting or nearby residential zoning districts that are generally developed to low scale residential uses.

Although residential zoning districts or buildings of residential use do not directly abut site, the building massing and site development are compatible and of similar scale to the adjacent buildings.

(2) New buildings are designed and oriented on the lot so as to be consistent with the established streetscape on those streets on which the project lot abuts. Streetscape is meant to refer to the pattern of building setbacks and heights in relationship to public streets.

The building height and setbacks are consistent with the established streetscape and pattern of development. The architectural concept incorporates a series of heterogeneous masses emerging from a spine running along the northern edge of the site. This creates relief and variety in the street wall, and incorporates a public entry forecourt and a private courtyard for the use of the student residents.

(3) In mixed-use projects, uses are to be located carefully to respect the context, e.g. retail should front onto a street, new housing should relate to any adjacent existing residential use, etc.

The project is an institutional dormitory with student residences on upper floors and active areas such as a dining hall, meeting spaces, a maker space and student courtyard located on the street level, facing the public way.

(4) Where relevant, historical context are respected, e.g. special consideration should be given to buildings on the site or neighboring buildings that are preferably preserved.

The project is not located in a recognized historic district, although it abuts the historically significant Metropolitan Storage warehouse. While the scale of the new building references the surrounding context, the proposed materials, while recalling the historic brick tapestry of the surrounding material context, yield another understanding and experience with a contrasting lightness and permeability. The building will be of compatible scale so it does not overwhelm the pedestrian and becomes part of the streetscape.

SECTION 19.32

Development should be pedestrian and bicycle-friendly, with a positive relationship to its surroundings. Indicators include:

(1) Ground floors, particularly where they face public streets, public parks, and publicly accessible pathways, consist of spaces that are actively inhabited by people, such as retail stores, consumer service businesses and restaurants where they are allowed, or general office, educational or residential uses and building lobbies. Windows and doors that normally serve such inhabited spaces are encouraged to be a prominent aspect of the relevant building facades. Where a mix of activities are accommodated in a building, the more active uses are encouraged facing public streets, parks and pathways.
In commercial districts, such active space consists of retail and consumer service stores and building lobbies that are oriented toward the street and encourage pedestrian activity on the sidewalk. However, in all cases such ground floor spaces should be occupied by uses (a) permitted in the zoning district within which the building is located, (b) consistent with the general character of the environment within which the structure is located, and (c) compatible with the principal use for which the building is designed.

The building lobby and main entrance face Vassar Street; the main approach to the building entrance is through a landscaped courtyard. Areas of activity such as the dining hall are located on the Vassar Street façade and facing the Pacific Street Corridor. Much of the first floor, with views into the public spaces of the building, are transparent.

(2) Covered parking on the lower floors of a building and on-grade open parking, particularly where located in front of a building, is discouraged where a building faces a public street or public park, and publicly accessible pathways.

The project does not have any surface parking or below grade parking.

(3) Ground floors should be generally 25-50% transparent. The greatest amounts of glass would be expected for retail uses with lesser amounts for office, institutional or residential use.

The south façade at Level 1 will generally be greater than 50% transparent. The crenellation in the plan affords a dynamic experience of the building for pedestrians on Vassar Street, with a variety of glazed and transparent walls revealing the internal workings of the building to the passer-by. Care has been taken to open the west end of the site into a plaza and provides a shaded forum for interactions between the MIT community and the public.

(4) Entries to buildings are located so as to ensure safe pedestrian movement across streets, encourage walking as a preferred mode of travel within the city and to encourage the use of public transit for employment and other trips. Relating building entries as directly as possible to crosswalks and to pathways that lead to bus stops and transit stations is encouraged; siting buildings on a lot and developing site plans that reinforce expected pedestrian pathways over the lot and through the district is also encouraged.

The main sidewalk along Vassar Street is the most direct pathway across the south face of the project site. At the west end, an existing pedestrian path traverses the short dimension of the site, connecting Pacific Street at the northwest and Vassar Street to the southeast. The urban design intent is to develop this route across the site, improving and making more prominent its role in providing a pedestrian and cyclist connection to the northwest of the campus, and enabling the western end of the site as a new gateway plaza. The East side of the site bordering the Metropolitan Warehouse will serve as a loading plaza for dining hall related deliveries and pick up. A continuous fire lane loops the site with access from the west and east, and maintains a 12 ft width across the north portion of the site. Two curbcuts and relocation of the two

pedestrian and bicycle crossings are proposed. The westernmost proposed pedestrian/ bicycle crossing aligns with the Pacific crossing. The easternmost proposed pedestrian/ bicycle crossing aligns with an existing desire line connection to campus from the south side of Vassar Street, and is shifted westward from the existing connection. The easternmost proposed curb cut is dimensioned to accommodate both the fire truck entrance and loading and is shifted slightly westward from the existing curb cut.

(5) *Pedestrians and bicyclists are able to access the site safely and conveniently; bicyclists should have, secure storage facilities conveniently located on-site and out of the weather. If bicycle parking is provided in a garage, special attention must be aid to providing safe access to the facilities from the outside.*

The long term bicycle parking is provided along the north side of the building, under a sheltering, continuous roof with weather protective enclosure walls and doors. The long term bicycle parking is accessed from a secured gate on the west side of the site, accessed from the Pacific Crossing Plaza pathway or through the main entrance of the building, directly north to the rear of the building. The east side of the bicycle enclosure has an exit only door to deter bicycle users from entering the long term bicycle parking through the loading area and plaza on the east side. Short term bicycle parking is provided in multiple locations- both near the building's main entrance as well as under the building's overhang on the west side of the site.

(6) *Alternate means of serving this policy objective 19.32 through special building design, siting, or site design can be anticipated where the building form or use is distinctive such as freestanding parking structures, large institutional buildings such as churches and auditoriums, freestanding service buildings, power plants, athletic facilities, manufacturing plants, etc.*

The building height and setbacks are consistent with the established streetscape and pattern of development in the surrounding campus context. The architectural concept incorporates a series of heterogeneous masses emerging from a spine running along the northern edge of the site. This creates relief and variety in the street wall, and incorporates a public entry forecourt and a private courtyard for the use of the student residents.

SECTION 19.33

The building and site design should mitigate adverse environmental impacts of a development upon its neighbors. Indicators include:

1) *Mechanical equipment that is carefully designed, well organized or visually screened from its surroundings and is acoustically buffered from neighbors. Consideration is given to the size, complexity and appearance of the equipment, its proximity to residential areas, and its impact on the existing streetscape and skyline. The extent to which screening can bring order, lessen negative visual impacts, and enhance the overall appearance of the equipment should be taken into account. More specifically:*
    a. *Reasonable attempts have been made to avoid exposing rooftop mechanical equipment to public view from city streets. Among the techniques that might be considered are the inclusion of screens or a parapet around the roof of the building to shield low ducts and other equipment on the roof from view.*

The roof hosts penthouse enclosures for the fresh air mechanical equipment, a generator, and a utility substation. The roof edge also features a continuous parapet which serves as an additional visual shielding device for any roof walkways between the penthouse enclosures. The equipment will be acoustically buffered so the outdoor areas can be enjoyed by the residents.

    b. *Treatment of the mechanical equipment (including design and massing of screening devices as well as exposed mechanical elements) that relates well to the overall design, massing, scale and character of the building.*

The fresh air intake louvers and the massing of the penthouse enclosures have been carefully integrated into the building massing approach and proposed façade materials.

    c. *Placement of mechanical equipment at locations on the site other than on the rooftop (such as in the basement), which reduces the bulk of elements located on the roof; however, at-grade locations external to the building should not be viewed as desirable alternatives.*

All critical mechanical equipment will be placed 26 ft above Cambridge datum to meet MIT's resiliency requirements. The building has no basement. All critical mechanical equipment for the residential areas will be placed on the roof, with the exception of equipment serving the dining hall like freezer and refrigerator walk-in units and the air-handling unit for this space. The fuel tank for the generator is located on an elevated platform in the loading dock area of the first floor.

    d. *Tall elements, such as chimneys and air exhaust stacks, which are typically carried above screening devices for functioning reasons, are carefully designed as features of the building, thus creating interest on the skyline.*

The building features a vertical stack element on the north façade, in appearance a cousin to its industrial counterparts in the neighborhood. Strong vertical elements standing against the predominantly horizontal form provide an architectural reference to the smokestacks of the immediate industrial context.

    e. *All aspects of the mechanical equipment have been designed with attention to their visual impact on adjacent areas, particularly with regard to residential neighborhoods and views and vistas.*

The building façade and massing has been designed taking into account the street frontage and the long vista from across the playing field, from the Pacific Street view corridor, and from an elevated perspective from Cambridgeport. The view along Vassar Street will be varied and interesting due to variety of architectural styles and building uses.

2) *Trash that is handled to avoid impacts (noise, odor, and visual quality) on neighbors, e.g. the use of trash compactors or containment of all trash storage and handling within a building is encouraged.*

Trash and recycling compactors will sit within the loading dock. Generally the loading activity occurs once a day in the morning, with trash and recycling pickups occurring on a weekly basis or as needed.

3) *Loading docks that are located and designed to minimize impacts (visual and operational) on neighbors.*

The loading dock is located on the east side of the building and may be shared with neighboring Metropolitan Warehouse. The loading area is on the north side of the east façade near the railroad tracks and bike shelter.

4) *Stormwater Best Management Practices and other measures to minimize runoff and improve water quality are implemented.*

The site will be designed to meet the provisions of the MassDEP Stormwater Management Policy for a redevelopment project. Stormwater management strategies for the proposed building and site improvements will provide mitigation for the stormwater runoff as required by the City of Cambridge standards and standard engineering practices of the State of Massachusetts. Proposed mitigation measures include the use of Cambridge-approved Best Management Practices ("BMP's"), including underground detention/infiltration systems, proprietary water quality management structures, use of porous pavements and installation of green roofs. Rainwater collected from the rooftops of the proposed building will be directed into the underground detention systems and the overflow will be routed to the drainage system in Vassar Street. Also, where possible, site stormwater will be directed into porous landscaping surfaces to promote increased infiltration.

During construction, standard engineering practices for erosion and sedimentation control will be implemented on site. A Stormwater Pollution Prevention Plan ("SWPPP") will be prepared for the site per the requirements of the United States Environmental Protection Agency ("US EPA") National Pollutant Discharge Elimination System ("NPDES") Construction General Permit ("CGP") as project construction will disturb more than one acre. The SWPPP will also be used to document compliance with the Leadership in Energy and Environmental Design ("LEED") Sustainable Sites Prerequisite for Erosion and Sedimentation Control.

5) *Landscaped areas and required Green Area Open Space, in addition to serving as visual amenities, are employed to reduce the rate and volume of stormwater runoff compared to pre-development conditions.*

The existing site is largely constructed of impervious surfaces: a parking garage and surface lot. The proposed condition greatly increases the pervious area of the lot with both lawn and planted areas as well as pervious pavement. Where required for loading or utility access, impervious surfaces are proposed, mainly on the east portion of the site. Loading patterns and fire truck access were optimized both to limit the area of the impervious surface, providing more landscape/ pervious area.

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 and shadows that might impact the operation of a Registered Solar Energy System as defined in Section 22.60 of this Zoning Ordinance.*

The building as a low rise will have little to no impact on neighboring buildings to the east and west which are taller in height. Directly south of the project are playing fields and directly north are MBTA railroad tracks, which are not adversely impacted by seasonal shading of these areas.

7) *Changes in grade across the lot are designed in ways that minimize the need for structural retaining walls close to property lines.*

A short distance of retaining wall is proposed on the north side, abutting the MBTA Spur track easement to maintain track elevation and a gradual slope needed for the fire truck access lane on the north.

8) *Building scale and wall treatment, including the provision of windows, are sensitive to existing residential uses on adjacent lots.*

The closest residential use on Vassar Street is Simmons dormitory to the west and other dormitory uses on the Amherst Street/ Alley to the south of the playing fields.

9) *Outdoor lighting is designed to provide minimum lighting and necessary to ensure adequate safety, night vision, and comfort, while minimizing light pollution.*

Downlighting and uplighting with LED adjustable lighting within the trees will be provided at Pacific Crossing Plaza for general safety. The fire lane will be kept clear of light poles. A possible artwork location in the lawn area at Pacific Crossing may have its own lighting that minimizes light pollution. Exterior soffits of the building overhangs will incorporate downlighting underneath for egress pathways. The eastern wall of the entry forecourt will be accented with light. The long term bicycle storage area on the north façade of the building will feature uplighting on the underside of the roof overhang to illuminate the storage area and pathway. Linear LED lighting will be integrated into star shaped seating at the entry courtyard and other permanent seating areas to provide low level illuminance. Downlighting and uplighting is proposed within the clusters of River birch trees on the East loading plaza. A few street light poles may be relocated along Vassar Street to accommodate spacing with street trees and proposed curb cut and pedestrian/ bicycle crossing locations.

10) *The creation of a Tree Protection Plan that identifies important trees on the site, encourages their protection, or provides for adequate replacement of trees lost to development on the site.*

There are no significant trees within the meaning of Section 8.66.030 of Cambridge Municipal Code ("Tree Ordinance") on the existing parcel. Within the site, there exist (4) Hornbeam trees that range in caliper from 5.5 to 5.75 inches for a total caliper of 22.75 in. The proposed landscape design includes new trees in several locations to exceed the total caliper of the existing trees on the site. Please refer to Section VII of this document for the project's Tree Study Narrative.

SECTION 19.34

Projects should not overburden the City infrastructure services, including neighborhood roads, city water supply system, and sewer system. Indicators include:

1) *The building and site design are designed to make use of water-conserving plumbing and minimize the amount of stormwater run-off through the use of best management practices for stormwater management.*

The following strategies and technologies will be employed in the plumbing design, which aid in water conservation:

- Low-flow plumbing fixtures in restrooms and shower facilities.
- Reduced or eliminated irrigation by use of native, drought tolerant plant species

The site will be designed to meet the provisions of MassDEP's Stormwater Management Policy for a redevelopment project. Stormwater management strategies for the proposed building and site improvements will pursue mitigation of stormwater runoff as available and required by the City of Cambridge standards and standard engineering practices of the State of Massachusetts. Mitigation measures currently under exploration include the use of Cambridge-approved BMP's, underground detention/infiltration systems, and proprietary water quality structures. Also, where possible, site stormwater will be directed into landscaping or porous surfaces to promote increased infiltration.

2) *The capacity and condition of drinking water and wastewater infrastructure systems are shown to be adequate, or the steps necessary to bring them up to an acceptable level are identified.*

Based on conversations with MIT and the CWD, there are typically no water capacity issues in the vicinity of the project site in this part of Cambridge. Hydrant flow tests will be performed to determine the capacity of the water mains in Vassar Street and Pacific Street. Should it be determined that there is inadequate pressure and volumes to provide the required flows, a booster pump will be added to the project to handle the deficiency.

Based on discussions with the City of Cambridge DPW, the capacity and condition of the sewer mains in Vassar Street are known to be adequate and in good condition. The project sewerage service locations will continue to be discussed and reviewed with the City of Cambridge DPW.

3) *Buildings are designed to use natural resources and energy resources efficiently in construction, maintenance, and long-term operation of the building, including supporting mechanical systems that reduce the need for mechanical equipment generally and its location on the roof of a building specifically. The buildings are sited on the lot to allow construction on adjacent lots to do the same. Compliance with Leadership in Energy and Environmental Design (LEED) certification standards and other evolving environmental efficiency standards is encouraged.*

The project is expected to meet or exceed LEED gold certification. The mechanical equipment will be located on the roof. Please refer to Article 22 narrative for more detail.

SECTION 19.35

New construction should reinforce and enhance the complex urban aspects of Cambridge as it has developed historically. Indicators include:

1) *New educational institutional construction that is focused within the existing campuses.*

The project is located on MIT campus on parcels owned by MIT.

2) *Where institutional construction occurs in commercial areas, retail, consumer service enterprises, and other uses that are accessible to the general public are provided at the ground (or lower) floors of buildings. Where such uses are not suitable for programmatic reasons, institutional uses that encourage active pedestrian traffic to and from the site.*

The project is located on a street that is nearly exclusively institutional in character. Active uses are located on the ground floor. Due to the nature of the building's use as a residence hall, requiring security for its residents, a single point of entry is located at the mid-point of the building. To the west of this entry point is a dining hall that is open to both residents and the MIT community. To the east of this entry point are flexible spaces for community gatherings, meeting rooms, and group study rooms. Exercise rooms and a maker space for residents and their guests occupy the east end of the building. These series of spaces, visually connected to Vassar Street, serve to enhance and add life to the pedestrian experience on Vassar Street. In addition to these interior active uses, the open landscaped areas of the entry forecourt and the western plaza at the Pacific Street crossing are publically accessible and the private courtyard for student residents is physically separated but visually connected to Vassar Street.

3) *In large, multiple-building non-institutional developments, a mix of uses, including publicly accessible retail activity, is provided where such uses are permitted and where the mix of uses extends the period of time the area remains active throughout the day.*

The project is a single building, institutional development.

4) *Historic structures and environments are preserved.*

The site has no existing historic structures, but its massing and materials are compatible with adjacent buildings of historical significance.

5) *Preservation or provision of facilities for start-up companies and appropriately scaled manufacturing activities that provide a wide diversity of employment paths for Cambridge residents as a component of the development; however, activities heavily dependent on trucking for supply and distribution are not encouraged.*

The building will be an institutional use, including a small makerspace for use by Vassar Street residents and their guests.

SECTION 19.36

Expansion of the inventory of housing is encouraged. Indicators include:

(1) Housing is a component of any large, multiple building commercial development. Where such development abuts residential zoning districts substantially developed to low-scale residential uses, placement of housing within the development such that it acts as a transition/buffer between uses within and without the development.

The project is an institutional dormitory. With 450 beds, students living in existing dormitories that have planned maintenance or replacement can be moved directly into the new facility. No students will be displaced into off-campus housing. In addition to the dormitory rooms, the project includes 12 apartments for graduate resident tutors, and 4 apartments to accommodate a faculty Head-of-House, a faculty Associate Head-of-House, an Area Director and a Visiting Scholar.

(2) Where housing is constructed, providing affordable units exceeding that mandated by the Ordinance. Targeting larger family-sized middle income units is encouraged.

Does not apply.

SECTION 19.37

Enhancement and expansion of open space amenities in the city should be incorporated into new development in the city. Indicators include:

(1) *On large-parcel commercial developments, publicly beneficial open space is provided.*

Project is an institutional dormitory, not a large commercial development. However publically beneficial open space will be provided at the building entrance courtyard, the Pacific corridor connection on the West side, and landscape and street trees along Vassar Street.

(2) *Open space facilities are designed to enhance or expand existing facilities or to expand networks of pedestrian and bicycle movement within the vicinity of the development.*

The location of the Pacific Street Corridor Plaza on the West side connects the building site with existing pedestrian and bicycle connection, providing more space at the plaza than is there currently. A larger landscaped and hardscaped plaza at this location connects visually to Pacific Street, while providing multiple pathways within its width across this area. The plaza will be a significant amenity for the proposed Grand Junction pathway. The existing bicycle tracks on Vassar Street will be incorporated into the new curb cuts on the north side of Vassar and the project's proposed pedestrian/ bicycle crossings.

(3) *A wider range of open space activities than presently found in the abutting area is provided.*

A dormitory use on this site will provide more life and activity at the street than the previous use as a parking garage and the MIT Grounds department. Most students will walk to campus or to other dormitories and the MIT community may visit the first floor of the building's dining hall or meeting rooms for special events. A private courtyard for the student residents is visually open to Vassar Street and provides seating at the sidewalk incorporated into the "floating wall" element. The entry courtyard, open to Vassar Street features a star shaped bench element and a landscaped area providing a welcoming entry to the building.

V. NOISE MITIGATION NARRATIVE

During the permitting phase it is necessary to determine the degree of sound reduction required. This is based upon estimates of the sound that will propagate from the project building and the sound level criteria appropriate for the neighborhood. Acentech has reviewed the preliminary information provided by WSP and predicted sound emissions to the nearby community. The sound criteria for this project will address the following factors:

- Character of sound generated by proposed facility – sound level and spectrum
- Daytime or nighttime operation of the sound sources
- Type of neighborhood – residential, business, or industrial

Existing Local and State Noise Requirements

Depending on the major equipment and noise control selected for a project, a typical facility can emit tonal and/or broadband sounds, low frequency sound, and steady and/or intermittent sounds that are noticeable in the community. The City of Cambridge and the MassDEP have noise requirements that protect residents from excessive sound. These requirements are:

Local Cambridge Noise Requirements

We understand from the City of Cambridge that the emergency generator noise emissions from each building do not need to be included as part of the noise emissions study. The emergency generators for this project will be tested during the daytime hours. We will provide appropriate generator noise control measures to meet the City of Cambridge daytime noise limits and the MassDEP Noise Guidelines (next section). All mechanical equipment components for each of the sites listed in this report will need to meet the Chapter 8.16, NOISE CONTROL of the City of Cambridge Code of Ordinances. This includes, energy recovery units, make up air units, exhaust fans, and all mechanical room louver openings. Daytime is defined as 7AM to 6PM by the City of Cambridge. Table 1 shows a summary of the noise limits applicable to this project.

Octave Band Center Frequency (Hz)	**Residential Area (dB)**		**Residential in Industrial (dB)**	
	Daytime	Other Times	Daytime	Other Times
31.5	76	68	79	72
63	75	67	78	71
125	69	61	73	65
250	62	52	68	57
500	56	46	62	51
1000	50	40	56	45
2000	45	33	51	39
4000	40	28	47	34
8000	38	26	44	32
Single Number Equivalent	**60 dBA**	**50 dBA**	**65 dBA**	**55 dBA**

Table 1.

Zoning in this area is complex; the Figure 1 shows the published Cambridge zoning map for the area. The "SD-6" and "SD-7"" zoned areas are considered special district and have the same requirements as the

residential "C" zoned areas. The "SD-8" zoned area has the same requirements as the "IB" zone in the vicinity, which is industry. "BB" is business.

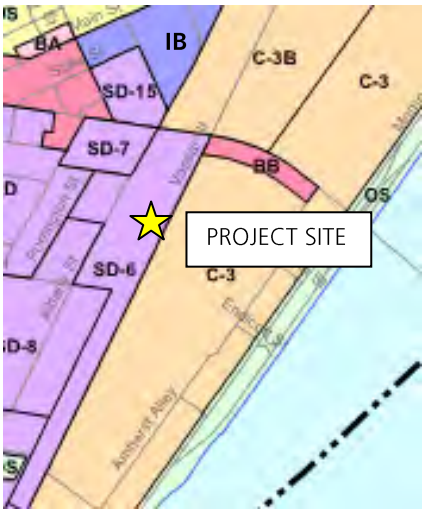


Figure 1.

State MassDEP Noise Guidelines

The Commonwealth of Massachusetts has enacted regulations for the control of air pollution (310 CMR 7.10). To enforce these regulations, The Massachusetts Department of Environmental Protection (MassDEP) has issued guidelines that limit the level of industrial noise in inhabited areas as follows: a) not to increase the residual ambient sound level by more than 10 dBA and b) not to produce a pure tone condition where the sound pressure level in one octave band exceeds the levels in the two adjacent octave bands by 3 dB or more. The residual ambient sound level may be defined for the purpose of these guidelines as the measurement of the L90 level over the time period of concern or by other means acceptable to MassDEP. In addition, MassDEP typically applies these guidelines both at the property line and at the nearest inhabited residences, with most concern at the residence. No other project noise criteria have been provided to us for consideration.

We have not conducted background sound measurements at the project site as part of the current community noise analysis, as MIT has confirmed that meeting the City of Cambridge Noise Ordinance will be sufficient to comply with the Article 19 noise submission. The sound limits established by the City of Cambridge will most likely be more stringent than the MADEP limits due to the urban setting.

Loading Dock Noise

A preliminary study has been conducted by the design team regarding the location of the loading docks and truck paths. The loading dock location is shown in Figure 2 below. Most of the loading dock areas are enclosed within the building, reducing the likelihood of noise impact to the residences. When the trucks are idle, they will be required to shut off their engine for loading and unloading. All deliveries will occur between 9AM and 9PM as agreed under the City of Cambridge Noise Ordinance, limiting truck noise during the nighttime hours.

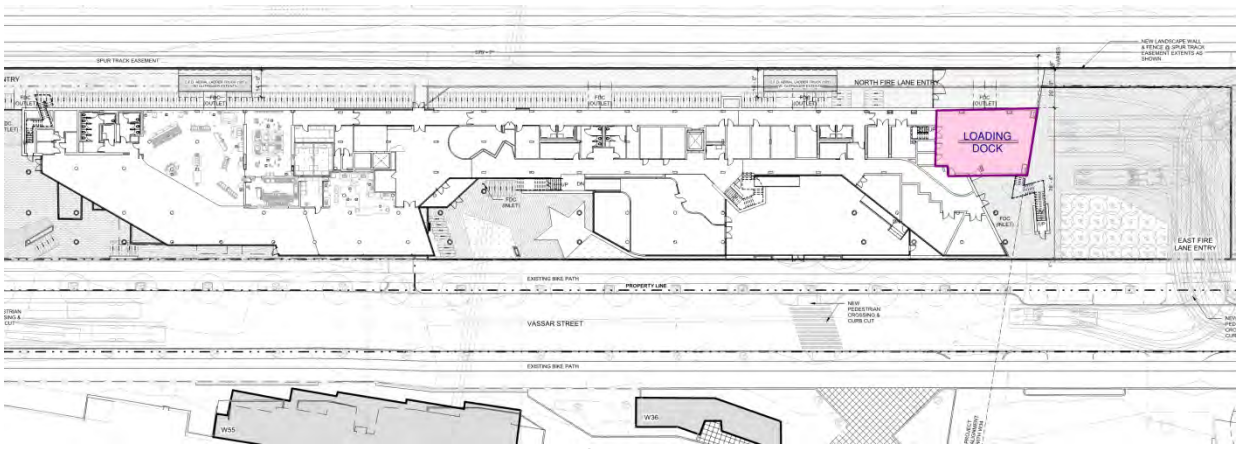


Figure 2

Operation Sound And Mitigation Measures

Based on the equipment layout shown in Figures 3a and 3b attached in the Appendix at the end of this report, the following abatement methods will be employed to control the sound of the MIT New Vassar St. Residence project:

Roof Level

1. Three energy recovery air handling units (10,250 cfm to 15,500 cfm) with sound attenuators provided on the outside air inlet openings and also the exhaust air openings. ERU-1 is located on the west wing of the roof and ERU-2 and ERU-3 are located on the east wing of the roof.
2. One makeup air unit, 12,600 cfm serving the dining area with sound attenuator at the outside air inlet opening, located on the west wing of the roof.
3. Two kitchen exhaust fans, from 600 cfm to 14,400 cfm with noise around the fans, located on the west wing of the roof.
4. One dryer exhaust fan, 3,600 cfm, located on the west wing of the roof.
5. Three air-cooled-condensing units (ACCU), 96,000 BTUH nominal cooling capacity and 108,000 BTUH nominal heating capacity. ACCU-1 is located on the west wing of the roof and ACCU-2 and ACCU-3 are located on the east wing of the roof.
6. One 750 kW diesel emergency generator in a walk-in sound attenuated enclosure and exhaust muffler, located on the east wing of the roof.

The sound emissions from emergency generator for this project will be specified to address compliance with the MassDEP noise guidelines and City of Cambridge Noise Standards. Table 2 presents the initial sound estimates for the project-only equipment at representative community locations, which are labeled in Figure 4 and include residential, business, and residential-in-industry areas.

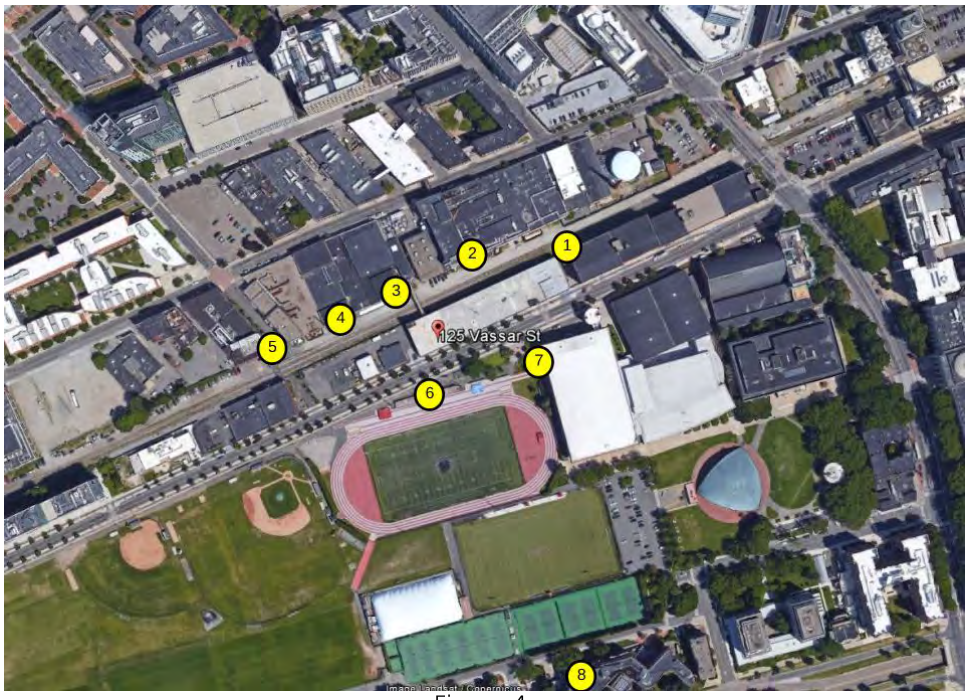


Figure 4.

Octave Band Center Frequency (Hz)	Predicted Sound Pressure Level from Project-Only Equipment (dB re: 20µPa)							
	Receiver Location #							
	#1	#2	#3	#4	#5	#6	#7	#8
31.5	47	55	57	54	50	53	48	41
63	45	55	56	53	48	52	47	40
125	39	48	51	48	42	47	42	36
250	33	43	47	46	40	41	37	31
500	28	40	39	38	33	37	37	29
1000	25	35	34	33	27	31	32	24
2000	19	31	32	30	24	27	26	18
4000	15	29	29	26	20	26	23	11
8000	<10	27	26	22	14	25	20	<10
Single Number Equivalent	**31 dBA**	**42 dBA**	**43 dBA**	**41 dBA**	**36 dBA**	**39 dBA**	**38 dBA**	**30 dBA**

Table 2.

The estimates, which are based on current project information, address compliance with the applicable noise requirements.

APPENDIX FOR NOISE NARRATIVE

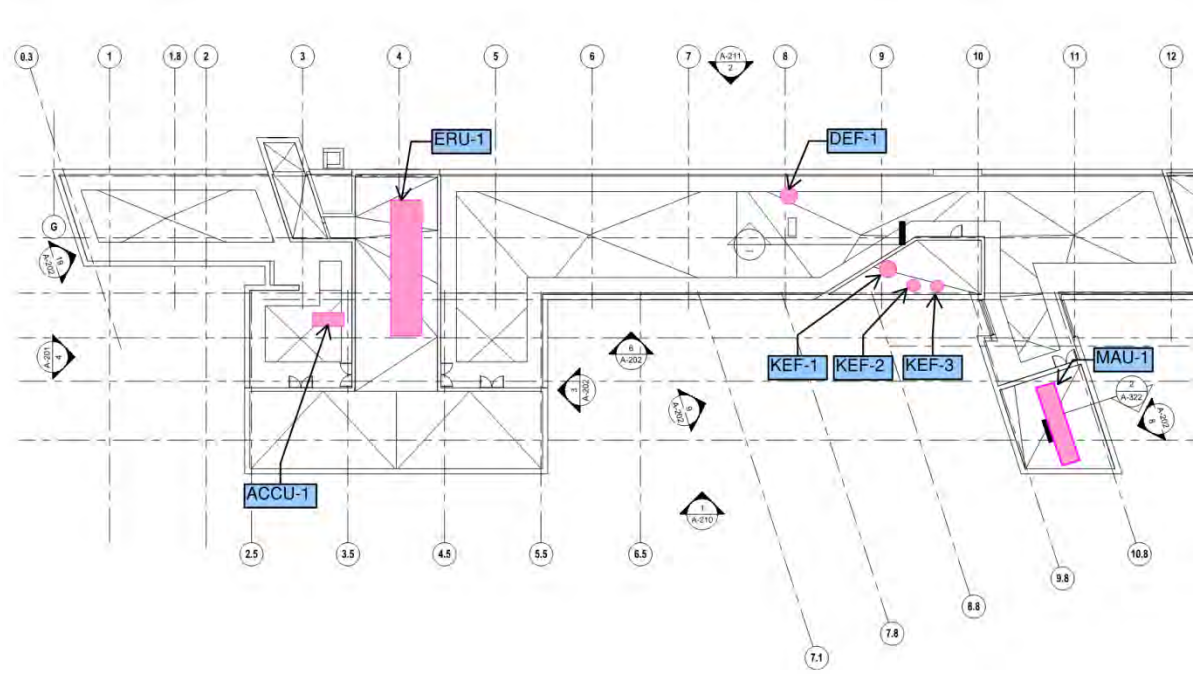


Figure 3a. Roof West Wing

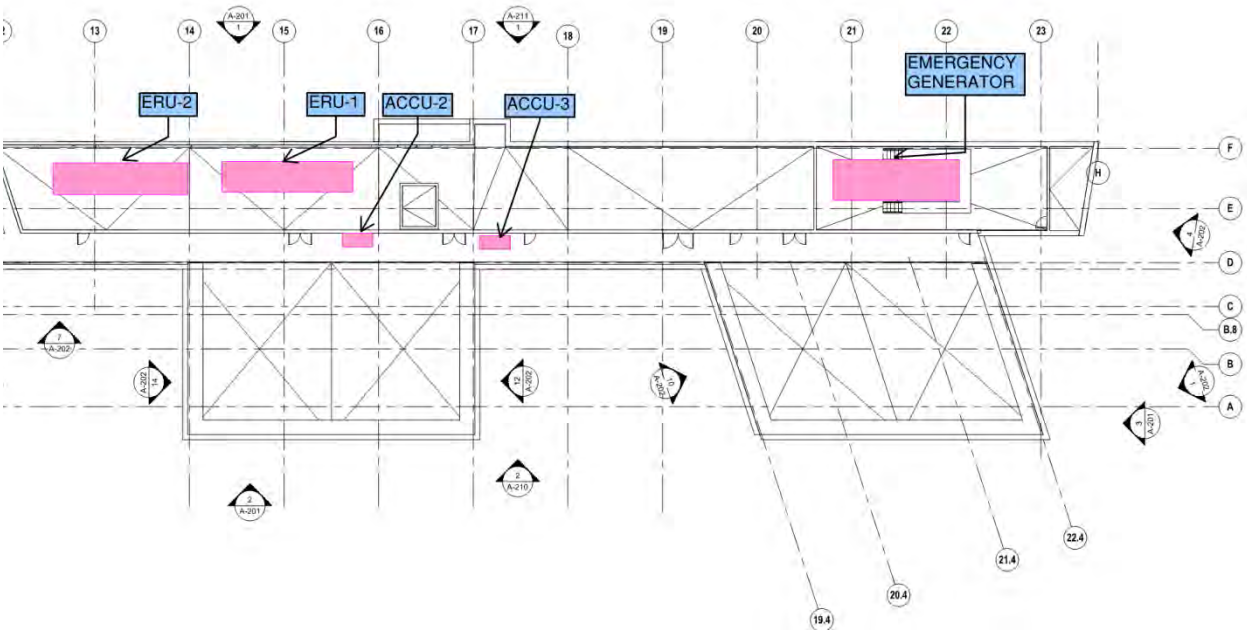


Figure 3b. Roof East Wing

VI. TRANSPORTATION ACCESS AND CIRCULATON STUDY SUMMARY

On behalf of Massachusetts Institute of Technology (MIT), Vanasse Hangen Brustlin, Inc. (VHB) has conducted a Transportation Access and Circulation Study for the proposed redevelopment of the existing West Garage and Grounds Services complex at 121 and 169 Vassar Street (the Project Site) for institutional uses, including a residence program with other complementary uses, such as student activity and study space, and a dining hall (the Proposed Project). The Vassar Street Undergraduate Residence Hall will serve as replacement housing for existing dorms being renovated elsewhere on campus and to replace beds lost at Bexley and Senior House. Therefore, the pedestrian and bicycle activity projected for the proposed Vassar Street Undergraduate Residence Hall reflects a shift in existing pedestrian and bicycle trips from existing residence hall locations rather than new pedestrian and bicycle trips. No change in the approximate 4,500 undergraduate population is contemplated as part of this planned residence.

Through discussions with the City of Cambridge it was determined that while a certified Transportation Impact Study (TIS) was not needed, transportation related impacts would be analyzed through a Transportation Access and Circulation Study ("the Study"). VHB sent a Request for Comment letter dated September 11, 2017 documenting the methodology being used to conduct the study. The Transportation Access and Circulation Study has been prepared and submitted to the City's Traffic, Parking and Transportation (TP&T) Department for review.

The Study 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 movements counts, pedestrian and bicycle counts, vehicle crash data, and transit service data.

The study area comprises of three signalized intersections, two railroad crossings and two mid-block crossings along Vassar Street and Massachusetts Avenue, as listed below and shown in Figure 1.

1. Massachusetts Avenue at Albany Street
2. Massachusetts Avenue at Vassar Street
3. Massachusetts Avenue at Pedestrian Crossing
4. Vassar Street Pedestrian Crosswalk in front of West Garage
5. Vassar Street Pedestrian Crosswalk in front of Simmons Hall
6. Massachusetts Avenue at Grand Junction Railroad Crossing
7. Vassar Street to Pacific Street Pedestrian Railroad Crossing

EXISTING PUBLIC TRANSIT SERVICES

The Project site is well served by multiple public transportation options in the area as shown in Figure 2. The Site is approximately half a mile from both Central Square Station and Kendall/MIT Station. Both Stations are served by the Red Line from Alewife Station in Cambridge to the north and by the Braintree and Ashmont lines to the south of Boston. At Ashmont, passengers can transfer to the Mattapan Trolley. Transfers can also be made at Park Street for the Green Line, Downtown Crossing for the Orange Line, and South Station for the Commuter Rail. The MBTA operates seven bus routes within the study area, including the following:

MBTA Bus # 1: Harvard/Holyoke Gate – Dudley Station via Mass Ave.

The Route 1 bus connects Harvard square in Cambridge to Dudley Square in Roxbury traveling through Massachusetts Avenue. The closes stop to the site is Massachusetts Avenue at Albany Street approximately 2 tenths of a mile from the Project Site. Weekday service on this route is provided between 4:37 AM and 1:27 AM, with 8 to 10 minute headways. With the implementation of the late-night service, service is extended until 2:37 AM on Fridays. Weekend service is provided between 4:40 AM and 1:40 AM on Saturdays and from 6:00 AM until 1:32 AM on Sundays

MBTA Bus # 47: Central Square – Broadway Station via B.U. Medical Center, Dudley Station & Longwood Medical Area

The Route 47 bus connects Central Square in Cambridge to the Broadway Red Line Station in South Boston traveling through the Fenway, the Longwood Medical Area and the Boston University Medical Area. The closest stop to the site is Brookline Street at Tudor Street, an approximate 10-minute walk from the Project site. Weekday service on this route is provided between 5:15 AM and 1:24 AM, with 10 to 20 minute headways. Weekend service is provided from 5:00 AM to 1:40 AM on Saturdays and from 7:30 AM to 1:04 AM on Sundays.

MBTA Bus # 64 Oak Square – University Park, Cambridge or Kendall/M.I.T.

The Route 64 bus connects Oak Square in Brighton to University Park or Kendall/MIT Station in Cambridge, via Cambridge Street. The closest stop to the site is at University Park. Weekday service is provided between 5:31 AM and 1:13 AM, with 13 22 minute headways during the peak hours. During the weekday morning and evening rush hour, buses do not service University Park but instead run to Kendall/MIT Station. Weekend service is provided from 5:20 AM to 1:15 AM on Saturdays and from 8:18 AM to 6:59 PM on Sundays. Weekend service runs from Oak Square to University Park and does not service Kendall/MIT Station.

MBTA Bus # 70: Cedarwood, Waltham– University Park

The Route 70 bus connects Cedarwood in Waltham to University Park in Cambridge, traveling through Watertown. The stop closest to the site is Franklin Street at Sidney Street, an approximately 10-minute walk from the Project site. Weekday service on this route is provided between 4:50 AM and 1:19 AM, with approximate 10 to 20 minute headways during the peak hours. Weekend service is provided from 5:00 AM to 1:27 AM on Saturdays and from 6:00 AM to 1:23 AM on Sundays.

MBTA Bus # 70A: North Waltham – University Park

This bus route follows the same path as Route 70 from University Park to the Waltham Commuter Rail Station but turns north onto Lexington Street and loops around Lakeview instead of continuing west on Main Street and terminating at Cedarwood. The stop closest to the site is Franklin Street at Sidney Street, an approximately 10-minute walk from the Project site. Weekday service on this route is provided between 5:30 AM and 8:20 PM, with approximately 30 minute headways during the peak hours. Service is provided from 7:00 AM to 8:39 PM on Saturdays. No service is provided on Sundays.

MBTA Bus Crosstown 1 (CT1): Central Square Cambridge – BU Medical Campus/Boston Medical Center

Bus Route CT1 is a limited stop, cross-town route that operates between Central Square in Cambridge and the Boston Medical Center in the South End of Boston. The closest stop is Massachusetts Avenue at Sidney Street, an approximately 10-minute walk from the Project Site. Weekday service is provided between 6:00 AM and 7:41 PM with 20 to 23 minute headways during the peak hours. No service is provided on the weekends.

MBTA Bus Crosstown 2 (CT2): Sullivan Square Station - Ruggles Station via Kendall/MIT Station

Bus Route CT2 is a limited stop, cross-town route that operates between Sullivan Square in Charlestown and Ruggles Station in Roxbury. The closest stop to the Project site is at Massachusetts Avenue and Vassar Street. Service on this bus route runs on 20 to 25 minute headways during the peak hours and is provided between 5:55 AM and 7:36 PM. No service is provided on weekends.

EXISTING PRIVATE TRANSIT SERVICES

In addition, the ample public transportation services within the study area, there are multiple private transit services offered by the Charles River Transportation Management Association (CRTMA) and MIT. Figure 3 illustrates the multiple MIT shuttle routes available to the MIT community and are described in detail below.

CRTMA EZRide Shuttle

The Charles River Transportation Management Association (TMA) operates the EZRide shuttle service between Kendall Square, East Cambridge, MIT and Cambridgeport. This shuttle provides connections to the Green Line at Lechmere Station and the MBTA commuter rail, the Green Line and Orange Line at North Station. The closest stop to the Project site is Albany Street at Pacific Street. Service is provided at 7-10 minute headways during typical commuter peak periods in each direction between 6:20 AM and 8:00 PM on weekdays. EZRide shuttles do not run on weekends. EZRide is free for all MIT students, faculty and staff.

MIT Tech Shuttle

MIT operates the Tech Shuttle which provides MIT students, faculty, and staff with a free shuttle around campus starting at Kendall Square and looping around Memorial Drive and Amherst Alley turning onto Vassar Street and later to Main Street where it again reaches Kendall Square. The shuttle operates Monday through Friday from 6:15 AM to 7:10 PM. Headways are 10 minutes during the AM and PM commuter peak periods and 20 minutes all other times. No weekend service is provided. In 2016, the Tech Shuttle had a total annual ridership of 328,000. The shuttle has a daily average ridership of 730.

MIT Boston Daytime Shuttle

MIT operates a shuttle between 84 Massachusetts Avenue and Commonwealth Avenue in Boston every 30 minutes between the hours of 8:00 AM to 5:55 PM on weekdays during the school year (September through May). This service is provided to MIT affiliates. No weekend service is provided. In 2016, the Boston Daytime Shuttle had a total annual ridership of 100,000.

Lincoln Laboratory – MIT Campus Shuttle

Lincoln Laboratory's Facilities Services Department operates a weekday shuttle service between the MIT campus (Building 39) and the main Laboratory site in Lexington. Service runs from MIT every two hours starting at 7:00 AM with the last shuttle departing at 5:15 PM. This service is provided to MIT affiliates.

MIT Weekend / Grocery Shuttle

The Weekend Shuttle, also called the Grocery Shuttle, is operated by MIT and transports MIT students to and from local supermarkets. This shuttle operates on three different routes. The first route travels from Campus to Costco and Target in Everett and operates between 11:00 AM and 4:20 PM with 75 minute headways every other Sunday during the fall school year with the closes stop to the Project site is in front of Simmons Hall. The second route travels from Campus to Trader Joe's and Whole Foods and operates between 11:30 AM and 4:30 PM with 45 minute headways every Sunday during the school year (September through May) with the closest stop to the Project site is in front of Simmons Hall. The third route travels from Campus to Star Market and operates between 12:00 PM and 4:30 PM with 20 minute headways every Saturday during

the school year (September through May). The closest stop to the Project site is in front of Simmons Hall. In 2016, the Grocery Shuttles had a total annual ridership of 6,500.

EXISTING PEDESTRIAN AND BICYCLE FACILITIES

Pedestrian amenities surrounding the Project Site include sidewalks along Vassar Street and Mass. Ave. Pedestrians are primarily provided concurrent walk times at signalized intersections. The mid-block crossings along Vassar Street satisfy pedestrian and bicycle crossing desire lines to and from MIT's main campus.

The Project Site is adjacent to the cycle track along Vassar Street, which provides separated bike lanes from Amherst Alley to Mass. Ave with the continuation of at-grade bike lanes to Memorial Drive and Main Street.

The primary modes of transportation for the MIT community and particularly the student, which this Project will serve, is walking and biking. According to observations and data collected for the Study, existing MIT dorms have an average mode share of 95 percent walking and 5 percent biking.

PROJECT GENERATED TRIPS

Trip generation was determined from MIT dormitory observations conducted on September 14, 2017. The observations were used to determine MIT trip rates per bed during the morning, mid-day, and evening peak hours. These rates were applied to the new bed count to determine the number of trips generated. The observed dormitories contained a cafeteria similar to the proposed cafeteria space in the new dormitory; the trips generated by the cafeteria are incorporated into the calculated trip rates determined by the field observations. The resulting Project generated trips by mode are shown in Table 1.

TABLE 1 PROJECT TRIP GENERATION BY MODE

	Walk	Bike	Total
Morning Peak Hour			
Entering	42	2	44
Exiting	160	8	168
Total	202	10	212
Mid-Day Peak Hour			
Entering	196	9	205
Exiting	213	10	223
Total	409	19	428
Evening Peak Hour			
Entering	167	8	175
Exiting	102	5	107
Total	269	13	282

As shown in Table 1, the Project is expected to generate approximately 212 total trips (44 entering, 168 exiting) during the morning peak hour, 428 total mid-day peak hour trips (205 entering, 223 exiting), and 282 total evening peak hour trips (175 entering, 107 exiting). The majority of the trips are walking trips, as indicated by the dormitory observations conducted.

Though these trips are generated by the Proposed Project and will be entering and exiting along Vassar Street, their presence in the pedestrian and bicycle network is not new. These pedestrian and bicycle trips are being reallocated from existing dormitories which currently utilize the study area intersections, thus reducing the impact of the Project.

PROPOSED ACCESS, CIRCULATION, SERVICE AND LOADING

The Project Site provides students and the MIT community convenient walking and bicycle access to the main academic buildings and athletic facilities. Figure 4 provides a neighborhood context map showing the site within a ten-minute walk to most of the academic buildings. Most of the Project trips accessing the site will be by walking, with a few by bike, as shown by the trip generation discussed above. The site access and circulation plan is shown in Figure 5. The building will provide one entrance along Vassar Street, located adjacent to short term bike parking and is serviced by sufficient pedestrian and bicycle facilities extending throughout Vassar Street. Users may travel to or from the site via Vassar Street, Pacific Street, or the foot path adjacent to the Johnson Athletic Center and proceed to the front door. A back door is also available and is located adjacent to the site's long-term bike parking. Bicycles can access the long-term bicycle parking located on the back side of the building through the front door or continue along Vassar Street and use the Pacific Street Plaza secure bicycle entrance.

The existing mid-block crossing on Vassar Street will be relocated to align with the crossing desire lines of the residents of the building and the foot path adjacent to Johnson Athletic Center. Additionally, the Project will also provide a new pedestrian and bicycle crossing extending from the Pacific Street Pedestrian Railroad Crossing. This will provide another visible crossing along Vassar Street for pedestrians and bicycles coming from MIT's north campus.

The Proposed Project allows access and egress for service and delivery vehicles at the east side of the site where two loading docks are located and along the front of the building in the proposed on-street loading zone, drop-off/pick-up area. While the proposed on-street loading area will require the removal of two metered parking spaces, the space will eliminate double-parking that could occur if such spaces are not provided near the entrance to the site. Fire truck access is provided along the north (back) side of the building with access from the loading area and the Pacific Street Plaza area. Figure 6 shows the proposed on-street loading area and truck turns for fire and loading vehicles into the site.

The Project is estimated to generate approximately 13 service and delivery trips daily with a majority of these trips occurring during the midday. MIT will manage larger deliveries such as equipment and food services to reduce impacts to the surrounding transportation systems.

MIT will manage move-in/move-out operations and utilize the on-street parking and proposed loading zone adjacent to the site. Students will use the main entrance for all move-in/move-out activities.

COMPLIANCE WITH BICYCLE PARKING REQUIREMENTS

The Project will provide bicycle parking in accordance with the City of Cambridge's Bicycle Parking Zoning Ordinance, as shown in Table 2 below.

TABLE 2 BICYCLE PARKING PROGRAM

Proposed Use	Gross Floor Area (GFA)	Quantity	Long-Term Parking Ratio	Long-Term Spaces	Short-Term Parking Ratio	Short-Term Spaces
Undergraduate Housing	132,721	450 beds	0.50/bed	225	0.05/bed	23
Graduate Apartments	9,000	12 units	1.00/unit	12	0.10/unit	2
Faculty Housing	6,000	4 units	1.00/unit	4	0.10/unit	1
Dining Hall	8,257	225 seats	1.00/1,000 SF	2	1.00/1,000 SF	9
Total	**155,978**			**243**		**33**

Bicycle Parking Ratios per City of Cambridge Bicycle Parking Guidelines

To satisfy the short-term bicycle parking requirement, a total of 34 spaces will be provide throughout the development to support the residents and student activities at the site. Figure 7 shows the approximate location of the short-term bicycle parking. A total of 243 long-term bicycle parking spaces will be provided along the back of the building in a covered and secure locker system storage facility. Figure 8 shows the location and compliance with the Bicycle Parking Zoning Ordinance. The specific long-term and short-term bicycle racks will be selected at a time closer to the construction and installation of the racks and will comply with all bicycle parking requirements in place at the time of the Special Permit application submission.

VEHICLE PARKING

Under the Proposed Project, all parking on-site will be eliminated. The impact of the elimination of these spaces and the reduction of vehicles in the area, has been considered. The certified MIT Kendall Square TIS incorporated 200 relocated spaces from the MIT campus ("200 MIT Academic Space Relocation" p. 151) to the new parking garage associated with this development. The current demand can be accommodated by other area parking garages and lots that currently have capacity. In addition, MIT has proposed to temporarily manage the Stata Center garage to support 136 additional spaces.

Additionally, in September 2016 MIT introduced the Access MIT program, providing new transportation demand management measures including an updated parking payment plan designed to reduce staff and faculty commitment to driving. The plan converted MIT Cambridge gated parking lots from one-year passes to pay-per-day lots. This allows individuals to pay for only what they use and not feel obligated to drive to campus because they have paid for a years' worth of parking. As MIT says *"So ditch the car when you can! Drive today, take the subway or bus tomorrow, and walk when the weather is nice. No annual commitment is required…".* With this plan, MIT has reduced parking demand by approximately 5% and hopes parking demand will be further reduced and thus not all 410 parking spaces being eliminated with this Project will need to be replaced.

While no vehicular analysis was conducted as part of this study, vehicles in the area will be reduced by the elimination of the West Garage. The intersection most affected by this reduction in vehicle traffic will be the Mass Ave at Vassar Street study area intersection. Approximately 45 percent of the existing West Garage traffic comes through this intersection. These vehicles will now be removed from the study area as they will be rerouted to the new Kendall Square garage off Amherst Street north, west and northwest campus parking facilities and the Stata Center garage east of the study area.

TRANSPORTATION DEMAND MANAGEMENT

MIT is committed to reducing single-occupancy vehicles traveling to MIT and has a strong transportation demand management (TDM) program to encourage sustainable modes including carpool/vanpool, public transportation, walking and biking. All MIT students, faculty and staff, including the MIT community using the Project, have access to the following TDM measures:

- On-Site Transportation Coordinator
- Charles River Transportation Management Association
  - EZRide Shuttle Service
  - Ride-Matching and Guaranteed Ride Home programs
  - TMA promotional events and support services
- Transit
  - On-site marking of T-services
- Bicycle
  - Bicycle parking facilities, short- and long-term
  - Lockers and showers
  - Hubway discount membership program
- Pedestrian
  - Pedestrian pathways and streetscape
  - Lighting for pedestrian pathways
  - Enhanced pedestrian connections
- Marketing and Promotion
  - Website
  - Transportation Fairs/Events

Student TDM

Student vehicle parking on campus has been on the decline, both in total volume and as a percentage of students on campus. MIT does not distinguish between graduate and undergraduate students in issuing campus parking permits. The number of students parking permits on campus peaked at 852 in 2012 - 2013. This amounted to 7.8% of the combined graduate and undergraduate population. The number of student permits has dropped by 71% to only 245 student permits issued in 2016 – 2017. That represents only 2.2% of the student population, of whom only 41% are undergraduates. This reduces the number of student owned vehicle on campus and promotes the use of public transit, the MIT shuttles, walking and biking. In addition, most recent biennial community survey shows that 94 percent of off-campus students get to campus by walking, biking or taking transit.

Faculty and Staff TDM

In September 2016, MIT introduced an updated, campus-wide, transportation demand management (TDM) program titled Access MIT. "Access MIT represents the Institute's progressive vision for rethinking the culture of commuting and encouraging sustainable transportation practices. These programs provide commuters with the flexibility to choose, day-to-day, how they would like to commute, and encourage us all to utilize a variety of transportation options over the course of a given week. By connecting the MIT community to flexible, affordable, and low-carbon transportation options, we seek to ease parking demand while positively impacting our campus, community, and environment."

The Project will encourage all faculty and staff to participate in Access MIT. The benefits include:

- Free use of the MBTA subway and local bus systems
- 60% commuter rail subsidy
- 50% subsidy for parking at MBTA Stations, up to $100 per month
- Shift from annual to daily pay-per-pay parking plans at MIT gated lots.

VII TREE STUDY: EXISTING CONDITIONS AND PLANNED LANDSCAPE IMPROVEMENTS

The site has four existing Hornbeam trees, ranging in caliper from 5.5" to 5.75," for a total on the site of 22.75" (Vol II, Existing Tree Plan). None of the trees are Significant within the meaning of Section 8.66.030 of Cambridge Municipal Code ("Tree Ordinance"). With no Significant trees on the site, there are no required Replacement Trees and, therefore, no Mitigation Plan under the Tree Ordinance. These four existing trees will be removed from the site to accommodate the planting associated with the Pacific Street public plaza. The plaza provides a connection from Albany Street to Vassar Street, including access to and from the future Grand Junction community path.

The site plan as a whole (Vol. II, Site Plan and Landscape Plan) proposes planting new trees in several locations and exceeding the total caliper of the existing trees on the site.

The Construction Management Plan is under development. Construction is likely to affect the 16 street trees that border the project site. Proposed curb cuts may impact some of the street trees. The City Arborist and other DPW personnel will be consulted on methods to best protect these trees during construction.

VIII ARTICLE 22 LEED CHECKLIST AND NARRATIVE

I. PROJECT DESCRIPTION

The MIT New Residence Hall is meeting the Special Permit application requirement with a minimum of LEED Silver Certification for LEED BD+C Multifamily Midrise v4. The project is currently tracking 75.5 points and 12.5 possible points which meets LEED Gold Certification for LEED BD+C Multifamily Midrise v4, and with these possible points it will meet LEED Platinum Certification.

II. AFFIDAVIT

I, Karla Butterfield, do hereby affirm that I have thoroughly reviewed the supporting design documents for LEED v4 BD+C Multifamily Midrise and confirm that the MIT New Residence Hall as designed exceeds the requirements for LEED Silver with 75.5 points and 12.5 possible points. The MIT New Residence Hall, located on Vassar Street in Cambridge, MA has been designed to meet the green building requirement under Article 22.20 of the Cambridge Zoning Ordinance.

Karla Butterfield, LEED AP Homes

Steven Winter Associates, Inc.

LEED Administrator and Sustainability Consultant

List of Team Members

Maureen M. Mahle, Senior Vice President – Director, Sustainable Housing Services

Paula Zimin, Director, Sustainable Building Services

Karla Butterfield, Senior Sustainability Consultant

III. SUSTAINABLE DESIGN AND DEVELOPMENT

INTRODUCTION

In compliance with Article 22.23, the following chapter outlines the LEED certification goals for the Project and describes the strategies employed to meet the targeted LEED requirements and credits based on this stage of design development. The current LEED Scorecard is presented as Figure 4.1. Attachment 3 includes an affidavit by the project LEED Accredited Professional.

The Project will register under the LEED v4 BD+C Multifamily Midrise program. It is tracking Gold level certification (76+ points). The following is a summary of points per category:

Integrative Process	[2 points]	
Location and Transportation	[15 points]	
Sustainable Sites	[6 points]	[0.5 possible points]
Water Efficiency	[8 points]	[1 possible points]
Energy and Atmosphere	[22 points]	[4 possible points]
Materials and Resources	[4 points]	[3 possible points]
Indoor Environmental Quality	[10.5 points]	[2.5 possible points]
Innovation	[6 points]	
Regional Priority	[3 points]	[1 possible points]
Total Points	**[76.5 points]**	**[12 possible points]**

CONFORMANCE WITH ARTICLE 22.23

INTEGRATIVE PROCESS

The Project is currently targeting 2 points total in the Integrative Process (IP) category and 1 point for exemplary performance.

IP Credit Integrative Process

Option 1. Integrative Project Team (1 point)

This credit will be earned with the experienced project team's capabilities and involvement throughout the design and construction process as well as at regularly held project team meetings. In addition to the Owner, the project team includes the Architect, Mechanical Engineer, Civil Engineer, Landscape Architect, Energy Modeler, Sustainability Consultant, and Structural Engineer. All of these team members will work together from design through construction with the goal of achieving a durable, energy efficient, sustainable and healthy project.

Option 2. Design Charrette (1 point)

Building upon the Integrative Project Team Credit above, a full day charrette was held on August 8, 2017 including MIT representatives, both architectural firms, MEP, landscape architect, civil & structural engineers, the construction company, and sustainability consultants.

Option 3. Trades Training (1 point)

In addition to the Design Charrette during the design phase, eight hours of training on the green aspects of the project will be conducted in the beginning of construction for the trades. The training will focus on how the trades can contribute to achieving each LEED for Homes prerequisite and attempted credit.

LOCATION AND TRANSPORTATION

The Project is currently targeting 15 points in the Location and Transportation (LT) category and 1 point for exemplary performance.

LT Prerequisite Floodplain Avoidance (Required)

The Vassar Street Residence Hall is located on a previously developed urban site in Cambridge, MA outside of the flood hazard area and therefore complies with this credit.

LT Credit Site Selection

Option 1. Sensitive Land Protection

Path 1. Previously Developed (4 points)

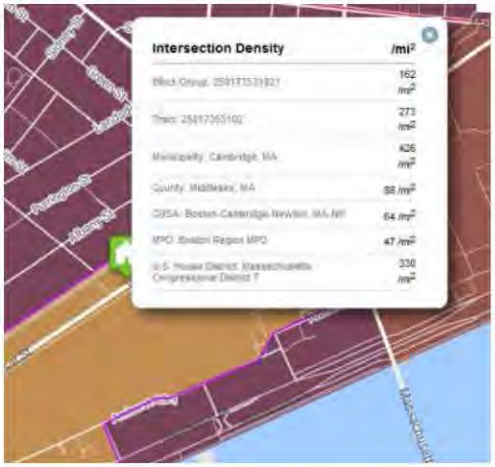
The Project Site is located on a parcel currently occupied by a West Garage which will be disassembled. It is a 100% previously developed urban site in Cambridge, MA and therefore complies with this credit.

Option 2. Infill Development (2 points)

The project is sited in an urban location and is considered an infill site with development on all sides of its boundaries, complying with the requirements for this credit.

Option 4. Street Network (1 point)

The project is located within 1 square mile of 162 intersections.



LT Credit Bicycle Network and Storage (1 point)

The project has bicycle storage within 200 yards of a bicycle network that connects to more than ten community resources, a school and employment center, and bus and the red line transit stops. There will be 243 long term bike spaces and 34 short term spaces for the 469 occupants.

LT Credit Compact Development (3 points)

The project exceeds 35 units per acre (275) and therefore is considered very high density for this credit.

LT Credit Community Resources (2 points + 1 point for exemplary performance)

Located within ½ mile walking distance to 16 community resources (28 qualifying) earns the project an extra point in exemplary performance.

Category	Tally*	Name of resource	Distance from
FOOD RETAIL			
Supermarket (up to 2)	1	LaVerde's Market	0.2
	1	Star Market	0.2
COMMUNITY SERVING RETAIL			
Clothing store or deparment store selling clothes	1	Teddy Shoes	0.5
	1	Star Market	0.5
Convenience store	1	Sunoco Gas & Convenience	0.4
Farmers market	1	Central Square Farmers Market	0.5
Pharmacy	1	CVS Rx	0.5
	1	Target	0.5
Other retail	1	Flour Bakery	0.3
	1	Toscanini's Ice Cream	0.5
SERVICES			
Bank	1	Bank of America	0.2
	1	TD Bank	0.5
Gym, health club, exercise studio	1	MIT Zesiger Sports & Fitness Center	0.1
Laundry, dry cleaner	1	City Express Dry Cleaner	0.5
Restaurant, café, diner excluding anything that ONLY has drive-through	1	Cambridge Grill	0.2
	1	Café Spice	0.2
CIVIC AND COMMUNITY FACILITIES			
Child care (licensed)	1	The David H. Koch Childcare Center	0.1
Community or recreation center	1	Jack Barry Field	0.1
	1	MIT's Briggs Field	0.2
Cultural arts facility (museum, performing arts)	1	MIT Museum	0.3
	1	Hart Nautical Gallery	0.3
Educational facility (school, university, adult education center, vocational school, community college	1	MIT	0.4
	1	Farr James F Inc School	0.4
Police or fire station	1	MIT Police	.4
	1	Lafayette Square Fire House	0.3
Post office	1	US Post Office	0.2
Public park	1	Tudor Street Dog Park	0.3
	1	Fort Washington Park	0.3
	28	**TOTAL Community Resources**	

LT Credit Access to Transit (2 points)

Located on an urban site in Cambridge, MA, the project site is in close proximity to many options of public transportation. It is within ¼ mile of several bus routes with a combined 412 weekday trips and 277 weekend day trips, qualifying for 2 points under this credit.

SUSTAINABLE SITES

The Project is currently targeting 6 points total in the Sustainable Sites (SS) category.

SS Prerequisite Construction Activity Pollution Prevention (Required)

The Construction Manager (CM) has provided and shall implement an Erosion and Sedimentation Control (ESC) Plan and for construction activities related to the demolition of existing site elements and construction of the new building. The ESC Plan shall conform to the erosion and sedimentation control requirements of the 2012 EPA Construction General Permit (ESC) and specific municipal requirements for the City of Cambridge.

SS Prerequisite No Invasive Plants (Required)

The project team is specifying plantings for the project that are identified by the local extension services as either native or non-invasive. While the LHMR program requires avoidance of invasive plantings and awards projects installing drought tolerant species, the project team has set a more rigorous goal by including strategies from the USGBC's Sustainable Sites Initiative (SITES®). While areas designated for outdoor seating, dining, recreation, and socializing are integral to the design, the landscape will support local fauna and limit reliance on irrigation.

SS Credit Heat Island Reduction

Option 1. Shading (2 points)

The project has designed for reduced heat island effects on the site through the use of. Energy Star qualified high solar reflective and green roof spaces. Hardscapes will be shaded where possible such that approximately 85% of the project is either shaded or non-absorptive material to achieve this credit.

SS Credit Rainwater Management (2 points)

Case 1. Low Impact Development

Roof and hardscapes storm water run-off will be managed through an onsite, underground detention/infiltration process, water quality management structures, porous pavement and installation of green roofs. Rainwater collected from the rooftops of the proposed building will be directed into the underground detention systems and the overflow will be routed to the drainage system in Vassar Street. Also, where possible, site storm water will be directed into porous landscaping surfaces to promote increased infiltration for the project site. Approximately 77% of the lot qualifies as permeable through these strategies qualifying for 2 points.

SS Credit Nontoxic Pest Control (2 points)

The project will integrate design strategies to mitigate pest control such as excluding wood siding, sealing external cracks and joints with caulking and installing pest-proof screens. MIT implements a thorough Integrated Pest Management Plan (IPM) throughout campus which includes an educational and awareness

component for residents and building managers. MIT students stay in the same housing they are assigned when entering the university which presents an excellent opportunity to implement pest management practices through awareness and education.

WATER EFFICIENCY

The Project is currently targeting 8 points total in the Water Efficiency (WE) category.

WE Prerequisite Water Metering

Case 2. Multifamily (Required)

The project will install a water meter for the entire building, meeting the requirement of this prerequisite. MIT is exploring additional metering options to monitor, track, and record water usage for competition amongst its dorms (similar to its energy savings competitions).

Prescriptive Path

WE Credit Indoor Water Use

Case 2. Multifamily and Midrise (5 points)

The design of the plumbing systems will include the use of low flow fixtures to reduce the water use of the building. In residential units, low flow WaterSense™ labeled shower heads with less than 1.5 gallons per minute flow rate will significantly reduce residential water use. Additionally, residential WaterSense labeled lavatory faucets which will operate at 0.5 gallons per minute or less will be installed further improving water efficiency. The project will also install WaterSense labeled toilets with a flush rate of 1.28 gallons per flush or less.

WE Credit Outdoor Water Use (3 points)

The project will not include any turf and the vegetated areas both at the street level and on building roofs will be planted with native and/or adapted vegetation. Irrigation will be installed with high efficiency features such as: rain sensors, zone controls, high-efficiency nozzles, pressure regulating devices, and drip irrigation in beds. LEED points for the WE section will most likely be tallied using the overall water reduction calculator, which allows the university to utilize a baseline target for performance goals.

ENERGY AND ATMOSPHERE

The Project is currently targeting 22 points total under the LEED v4 Multifamily Midrise, Energy and Atmosphere (EA) category. The Rating System offers two pathways for compliance with the prerequisite and credits. The pathways are compliance through demonstrated performance (ASHRAE 90.1 modeling) or compliance through prescriptive measures. This project will comply with EA prerequisites and credits by demonstrating performance with a whole building, ASHRAE 90.1 energy model.

EA Prerequisite Minimum Energy Performance (Required)

The project is exceeding requirements of ASHRAE 90.1-2010 Sections 5.4, 6.4, 7.4, 8.4, 9.4 & 10.4.

EA Commissioning

Option 1. Commissioning with Energy Star Protocols (Required)

This project will comply with the Energy Star qualified multifamily high rise buildings testing and verification protocols.

EA Prerequisite Energy Metering

Case 2. Multifamily (Required)

The project will install a whole-building gas meter and an electric sub-meter in residential and common areas complying with the requirement of this credit.

EA Prerequisite Education of Homeowner, Tenant, or Building Manager (Required)

The key to a successful project is during operations, and the building manager is the center of operations. The project team will assemble an operations and training manual for the building manager, and will coordinate an orientation with appropriate system vendors. In collaboration with the project design team, the Applicant will also develop a tenant operations and training manual to be provided to residents during orientation.

EA Credit Annual Energy Use (21 points)

A primary project goal is to design and build an exemplary structure with extremely low energy consumption and low life cycle costs. The building is designed to meet multiple energy codes and standards, including those set by the City of Cambridge and ASHRAE Standard 90.1. Energy efficiency strategies will include:

1. High performance envelope
2. Reduced Lighting Power Density in common areas, corridors, and dorms
3. Lighting Controls beyond code
4. Energy Recovery Ventilation
5. Reduced fan power, high performance heating and cooling units and distribution controls
6. Low-flow plumbing fixtures
7. High Efficiency Central Plant
8. Energy Star certified appliances where applicable
9. Energy efficient commercial kitchen equipment.

All mechanical, electrical, and plumbing (MEP) equipment shall be of the highest quality to minimize maintenance while providing long useful life and high operating efficiencies. MEP equipment shall be monitored by a central building management system (BMS) accessible via the internet from any location. The basic HVAC system(s) configuration is valance with Energy Recovery Ventilation (ERV) fuel sourced from the

MIT Central Utility Plant presently undergoing upgrade planning. The HVAC systems will be "right-sized" to match the heating and cooling loads, with no oversizing, and distribution systems will be compact without compromising occupant comfort. The HVAC system will be required to meet occupant thermal comfort as outlined by ASHRAE 55 Thermal Environmental Conditions for Human Occupancy. To ensure efficient operations and comfort, comprehensive commissioning of the HVAC systems, domestic water heaters, lighting control and electrical systems will be conducted. Passive strategies, such as solar shading, daylighting, and optimized massing and orientation will reduce the impact of cooling and heating loads. Thermal insulation levels will ultimately be selected based on energy model outputs and whole-building performance metrics. Thermal bridging will be minimized resulting in optimized overall building enclosure energy efficiency. The effects of building structure, cladding systems, and attachment methods will be carefully examined to ensure thermal bridging is minimized.

LEED v4 MFMR calculates energy cost savings as compared to ASHRAE 90.1 -2010; the project is tracking to obtain a minimum of 15%-20% below a baseline building based on ASHRAE 2010. However, the minimum building energy standard that serves as the baseline for this project will be ASHRAE 90.1 Energy Standard for Buildings, Except Low-Rise Residential Buildings, 2013 Edition. Project team goals and decisions are based upon this more rigorous energy modeling assessment. The project will also follow the International Energy Code 2015 with amendments based on Massachusetts Stretch Energy Code. The City of Cambridge has adopted the MA Energy Stretch Code (Appendix AA to 780 CMR: State Board of Building Regulations and Standards). The MA Energy Stretch Code requires new buildings over 100,000 SF to demonstrate an energy cost reduction of a minimum 10% in comparison to ASHRAE 90.1 2013. MIT intends to exceed this minimum target with 12% to 15% energy cost reduction in comparison to ASHRAE 90.1 2013 by constructing a high performing, air tight envelope with high efficacy lighting, appliances and equipment. LEED v4 MFMR credits projects with high occupancy per square foot. In addition to the 13 points earned with the ASHRAE savings, the project earns 8 addition points through the homes size adjustment calculation. In addition, through MIT's Energy Consumption Reduction MOU agreement with Eversource, the project has engaged with Eversource and is developing energy savings strategies focused on reducing the site consumption of the building.

EA Credit Advanced Utility Tracking (1 point)

The building owner has agreed to share all applicable utility data with the USGBC via a pre-approved third party.

MATERIALS AND RESOURCES

The Project is targeting 4 points total in the Materials and Resources (MR) category.

MR Prerequisite Certified Tropical Wood (Required)

The project specifications will outline a preference for non-tropical, reused or reclaimed, or Forest Stewardship Council (FSC) or USGBC-approved equivalent products and will require submittals for all wood products to indicate the country of origin of the wood. If a tropical wood is specified, appropriate documentation and chain of custody will be required.

MR Prerequisite Durability Management (Required)

The project team will demonstrate all minimum durability planning strategies mandated by regulatory agencies and LEED will be designed and implemented effectively. Building durability goals will be met through enhanced building enclosure, component systems, and material selection. Resource efficiency will be met by specifying and installing materials of recycled content and local sourcing when available. Greenhouse Gas (GHG) impact and Life Cycle Cost Analysis (LCCA) are the basis for specifying systems. During the design decision-making process, the team is converting energy modeling predictions into GHG equivalencies using MIT's Central Utility Plant GHG Metrics, allowing for an educated evaluation of specific Energy Efficiency Measures (EEMs) and materials.

MR Credit Durability Management Verification (1 point)

The owner has retained a LEED Green Rater to assist the contractor in ensuring the delivery of a durable building and verify the ENERGY STAR for Homes version 3 water management system builder checklist items executed.

MR Credit Environmentally Preferable Products (2 points)

The project specifications will require primary materials, such as concrete and drywall, to be extracted, harvested and manufactured within a 100-mile radius of the project site. High recycled content, minimum 25% postconsumer and/or 50% postindustrial waste recycled content, will also be pursued for materials, including concrete, insulation, counters and flooring. The project team is utilizing resources such as The Cradle to Cradle Products Program and The Health Product Declaration Collaborative to assess materials and finishes. Cabinets will be supplied by an Extended Producer Responsibility designated manufacturer.

MR Credit Construction Waste Management (1 point)

The construction management company has provided a demolition management plan including strategies for removing debris from the site. Prior to the onset of construction, the CM will prepare a Construction Waste Management plan, and provide monthly logs to the Applicant and the sustainability consultant. While the LEED v4 workbook calculates points for waste reduction as compared to a baseline allowance, a recent Credit Interpretation Request (CIR) allows multifamily building to use diversion reports to show compliance. This project will maximize construction debris that will be diverted from landfills and incinerators. In addition, the waste management logs will sort by material and show a minimum of four materials being diverted throughout construction.

INDOOR ENVIRONMENTAL QUALITY

The Project is currently targeting 10.5 points total in the Indoor Environmental Quality (IEQ) category.

EQ Prerequisite Ventilation (Required)

Local Exhaust

Each apartment and dorm room must be provided with adequate exhaust for local points of contaminants, such as bathrooms and kitchens, as required by ASRHAE 62.2-2010. The project will provide adequate exhaust with high efficacy fans. All local exhaust systems will be ducted directly to the outside.

Whole Unit Mechanical Ventilation (Required)

Each apartment and dorm room must be provided with sufficient outdoor air as required by ASHRAE 62.2-2010. The project will provide sufficient outdoor air as required to each apartment with a balanced, energy recovery ventilation system.

Non Unit Spaces

The project is designed to meet the minimum requirements of ASHRAE Standard 62.1 – 2010 Sections 4 through 7 for all non-unit spaces. Filters will have a MERV 11 or higher rating for these systems and will be part of a scheduled maintenance agenda.

EQ Prerequisite Combustion Venting (Required)

The project will provide sufficient exhaust for combusting appliances such as kitchen ranges, and water heaters. In addition, carbon monoxide sensors will be provided to each apartment and sleeping areas. No fireplaces will be installed in this project, complying with the requirements of this credit. Combustion for heating and domestic hot water equipment is off site at the CHP facility making the residential areas combustion free.

EQ Prerequisite Garage Pollutant Protection (Required)

The project meets this mandate as no on-site garage is included in the design.

EQ Prerequisite Radon-Resistant Construction (Required)

Cambridge, MA is located in a high risk area for Radon according to the US EPA. The project team will incorporate radon mitigation measures into design in construction which include these five components: 1) a gas-permeable layer; 2) heavy-gauge plastic sheeting; 3) sealing and caulking of all penetrations through the concrete slab; 4) vent pipe that exhausts gases to the outside through side wall or roof; and 5) electrical outlet near vent piping.

EQ Prerequisite Air Filtering - Good Filters (Required)

Minimum MERV 8 filters will be provided on all recirculating space conditioning systems, and MERV 6 filters will be provided on all mechanically supplied outdoor air systems with 10 feet or more of ductwork supplying apartments and dorm rooms.

EQ Prerequisite Environmental Tobacco Smoke (Required)

Smoking will be prohibited in all areas of the building and outside the building except in designated smoking areas located at least 25 feet from all entries, outdoor air intakes and operable windows.

EQ Prerequisite Compartmentalization (Required)

Each residential apartment will be compartmentalized to minimize leakage between units. Uncontrolled pathways for indoor air pollutants between units will be reduced by sealing penetrations in walls, ceilings, and floors and by sealing vertical chases adjacent to the units.

Acceptable sealing of residential units will be demonstrated by blower door testing. The procedure described by RESNET will be used to demonstrate compliance with an allowable maximum leakage of 0.23 cfm50 per square foot (0.07 cmm50 per square meter) of enclosure (i.e., all surfaces enclosing the apartment, including exterior and party walls, floors, and ceiling). The owner has retained a RESNET accredited provider and rater to perform these air infiltration tests.

EQ Credit Enhanced Ventilation

Option 2. Enhanced Whole-House Ventilation (2 points)

A balanced energy recovery ventilation system will be designed and installed to meet ASHRAE 62.2 – 2010 for residential apartments and dorm rooms. Oversight of installation and final testing of flow rates will be conducted by the third party rater retained by the owner. The tested rates will not exceed designed flow calculations by more than 10%.

EQ Credit Contaminant Control for multifamily projects (1 point)

To reduce the spread of dirt and related contaminants into the building, exterior entryways to common areas will have a permanent walk off mat at least 10 feet long. (0.5 points)

Ducts and vents will be sealed to minimize contamination from construction debris. The third party Green Rater will verify this strategy during all phases of construction. Prior to occupancy the building will undergo a 48 hour flush out with windows open (in accordance with weather and safety) and fans running continuously. Filters will be replaced after this process which is intended to expedite off gassing of building materials and finishes for enhanced indoor air quality. (0.5 points)

EQ Credit Balancing of Heating and Cooling Distribution Systems

Case 1. Forced-Air Systems

Option 1 & 2 (2 points)

This project earns 1 point as a multifamily building with average sized units under 1,200 sf. Additionally, the supply air flow rates will be tested by a third party balancing contractor to demonstrate ± 20% (or ± 25CFM) of the calculated values from the ACCA Manual J room by room load sizing.

EQ Credit Combustion Venting (2 points)

No fireplaces will be installed in this project, complying with the requirements of this credit.

EQ Credit Enhanced Garage Pollutant Protection

Option 3. No Garage or Detached Garage (1 point)

The project achieves this credit as no on-site garage is planned for the residents.

EQ Credit Low-Emitting Products (1.5 points)

Interior finish materials such as paintings and coatings, adhesives and sealants, and flooring will be verified for low VOC content that will meet requirements of CA Section 01350.

EQ Credit No Environmental Tobacco Smoke (1 point)

Smoking will be prohibited in all areas of the building. The prohibition is communicated to residents through the building agreement and training session.

INNOVATION

The Project is currently targeting 6 points total in the Innovation (IN) category.

IN Prerequisite Preliminary Rating (Required)

Multifamily construction can be a rushed process without thought of impact of the development to the community, the residents, or the larger environment. LEED for Homes requires project teams to take the essential first step to sustainability planning with a Preliminary Rating during the design phase. The first rating was conducted at a sustainability kick off meeting on November 28, 2016 with subsequent updates to present date.

IN Credit Innovation

Option 1. Innovation commissioning (1 points)

The project team will employ a commissioning agent (CxA) with experience on previous buildings of similar scope including experience through design phase through at least 10 months of occupancy. The CxA will complete commissioning process (CxP) activities for the building's thermal envelope in accordance with ASHRAE Guideline 0–2005 and the National Institute of Building Sciences (NIBS) Guideline 3–2012, Exterior Enclosure Technical Requirements for the Commissioning Process, as well as, mechanical, electrical, plumbing, and renewable energy systems and assemblies in accordance with ASHRAE Guideline 0–2005 and ASHRAE Guideline 1.1–2007 for HVAC&R systems, as related to energy, water, indoor environmental quality, and durability. The CxP will include the following: review contractor submittals; verify inclusion of systems manual requirements in construction documents; verify inclusion of operator and occupant training requirements in construction documents; verify systems manual updates and delivery; verify operator and occupant training delivery and effectiveness; verify seasonal testing; review building operations 10 months after substantial completion; develop an on-going commissioning plan.

IN Credit Innovation

Option 2. Pilot

Design for Adaptability (1 point)

To reduce the materials needed for and waste produced from future maintenance, repair, renovation and rehabilitation through structural, mechanical, and user-induced design the project team will achieve adaptability in design. The following universal design features will be followed: zero step main entrance; accessible doorway having a minimum clear width of 32"; accessible passage routes; adaptable bathrooms; accessible HVAC and lighting controls.

Option 3. Additional Strategies (3 points)

Exemplary performance in Integrative Process (IP) by achieving all three strategies (1 point).

Exemplary performance in Location & Transportation (LT) with access to 28 community resources (1 point).

Pilot Credit: Design for Active Occupants (1 point). The project team is designing for active occupants to help improve the health of building users through physical activity while reducing environmental impacts. The project is being designed to have at least one main stair that enables occupants to travel between the building entrance floor(s), occupant's own destination floor and common use floors and include the following: make accessible staircases visible and inviting; install architectural light fixtures that provide a level of lighting in the staircase(s) consistent with or better than what is provided in the building corridor; provide daylighting at each floor/roof level of the stair(s) using either windows and/or skylights; place signage encouraging stair use for health and other benefits at all elevator call areas and outside stairwells on each floor; use inviting sensory stimulation such as artwork and/or music in stairwells; provide exercise equipment or exercise opportunities.

Innovation: Green Power & Carbon Offset (1 point). This credit is used to encourage the reduction of greenhouse gas emissions through the use of grid-source, renewable energy technologies and carbon mitigation projects. The owners will engage in a contract for qualified resources for a minimum of five years, to be delivered at least annually. The contract will specify the provision of at least 50% or 100% of the project's energy from green power, carbon offsets, or renewable energy certificates (RECs).

IN Credit LEED Accredited professional (1 point)

At least one principal participant of the project team will provide their LEED Accredited Professional (AP) Homes certificate to facilitate team integration through the certification process.

REGIONAL PRIORITY

The Project is currently targeting 3 points in Regional Priority (RP) category.

RP Credit Regional Priority (3 points)

The project can target a number of Regional Priority credits. The project team will be evaluating the options to determine which one best fits the sustainability goals for the project currently the following credits are anticipated:

Annual Energy Use exceed 15 point threshold in Climate Zone 5 (1 point)

Exceed Compact Development threshold (1 point)

Heat Island Reduction exceed 2 point threshold (1 point)

ENERGY USE REDUCTION – PATH TO NET ZERO

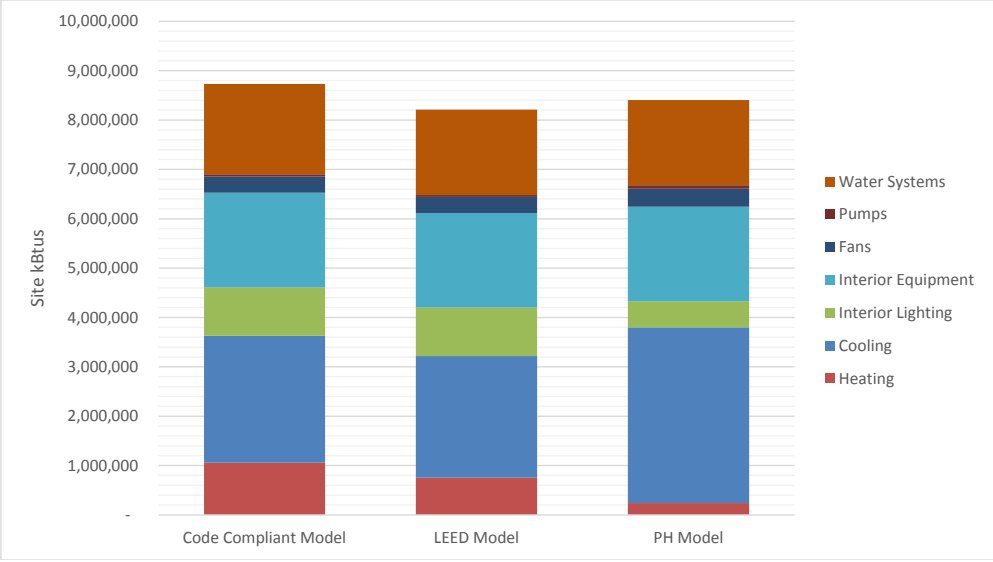
NET ZERO POTENTIAL

In alignment with the LEED for Multifamily Midrise goal of achieving a sustainable, energy efficient, and durable building, Passive House was also investigated for the Vassar Street Residence. The primary goal of Passive House is to reduce loads as much as possible before introducing systems and equipment to balance the space to be comfortable for occupants. During early concept design, the team thoroughly investigated load reduction, first with the Passive House Planning Package software. Once loads were reduced, the team evaluated several high efficiency HVAC options with various metrics as follows:

HVAC System	Evaluation Metric
Water-Source Heat Pump	First cost vs Operational cost
Fan Coil Units	Space requirements
Air Cooled / Water Cooled VRFs	Occupant Control and Thermal Comfort
Radiant Panels	Outdoor Air delivery requirements
Valence Panels	Acoustics

The valence system offers the best solution for this project based on the evaluation metrics, offering minimal pump and fan energy and additional efficiency through the highly efficient new campus utility plant coming online in 2019.

In schematic design, PHPP and ASHRAE simple box modeling were used to continue to analyze first cost and operational costs. The ASHRAE analysis shows that the internal loads are primary drivers of energy use in this building, and therefore PH was not cost effective and not achieving the intended project goals.



The MIT team learned a lot about building durability, comfort, health and energy during this feasibility effort. Building durability and occupant comfort can be achieved with the elimination of thermal bridging and infiltration in the exterior envelope design. Indoor air quality is essential to occupant health, but also impacts energy use. Ventilation is a key factor for these two critical building characteristics and requires the design team to design an effective and energy efficient ventilation system. Finally, before the HVAC system was evaluated, the internal loads of the building and building operation schedule were investigated, and included potential plug loads, lighting targets, and the kitchen and dining loads.

The lessons learned during the Passive House feasibility study will continue to be applied to reduce energy for the project. The current ENERGY STAR® Target Finder score is a 92 – and we believe we will continue to improve this target as we work through the final details of the design.

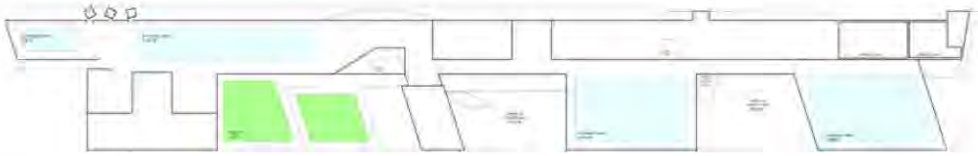
TRANSITION TO NET ZERO

The City of Cambridge is committed to net zero, and MIT is working hard to help the City achieve that goal in various ways. On this project, and other projects of this scale, net zero at the site level is exceptionally difficult based on currently available technologies. The project is five stories in height and as a dormitory with a commercial kitchen, it is both dense and has a high process load. Inherently, this project has a reduced ability to off-set its load with a low roof area to building area ratio.

In a PV study that was conducted for the project, four locations were identified on the building where solar would be most appropriate. Limitations exist due to green roof, mechanical systems and general size or shadow impact limitations. The Vassar Street Residence will be built to be PV ready for an 81.2 kW system, which is anticipated to off-set energy use of the building by approximately 3%.

Percent of U.S. buildings by floor area that could achieve net-zero as a function of number of floors

Credit: BuildingGreen



Although the building as a stand-along project cannot achieve net-zero at the site level, MIT is committed to reducing their carbon footprint in support of the City of Cambridge's Net Zero Action Plan. Given our current understanding of available technologies, one potential path for the Vassar Street Residence to achieve net zero would be a de-carbonization of the ISO New England electrical grid and deployment of technologies that can take advantage of grid improvements. MIT has begun to explore ways of decarbonizing the electrical grid which can be seen by MIT's recent alliance with Boston Medical Center and Post Office Square Redevelopment Corporation in a 25-year power purchase agreement (PPA) enabling the construction of a 60-megawatt solar farm (occupying roughly 650 acres) that otherwise would not have been built. MIT will purchase carbon-free electricity, equating to 40% of our current campus electric use.

As noted above, the Vassar Street Residence will be connected to MIT's central plant infrastructure which will provide chilled water, hot water and electricity. The building's systems are designed to utilize chilled water and medium temperature hot water distribution systems. Therefore, there are no technical barriers to the building accepting utilities from a de-carbonized or net-zero carbon source.

MIT will continue to explore opportunities to de-carbonize the central plant. MIT is currently pursuing a significant central plant upgrade that will reduce emissions across all campus buildings served by the plant, to be operational in the end of 2019. As the electric grid improves in the future, there is a potential for MIT to further de-carbonize the campus through the deployment of alternate technology (heat generated electrically to then produce hot water or steam). MIT will explore these options based on changes in low carbon fuel options and the electrical grid's carbon intensity.

As the grid and technology evolves and improves over time, the strategies for MIT to upgrade their central plant will evolve and will use the latest available technology, which may not currently be understood, to support making a transition that is economically feasible, reliable, and decarbonized.

IX. SUMMARY OF COMMUNITY OUTREACH

April 25, 2017

Cambridgeport Neighborhood Association (CNA) ~30 attendees

MIT asked to be on the agenda of the CNA's monthly meeting. The project team provided an introduction to the proposed Vassar Street residence hall by sharing information about the Institute's student housing activities and plans, the location and context of the site, and preliminary thinking related to the design of the facility. MIT staff responded to questions and comments related to Institute housing, parking, and landscaping.

October 4, 2017

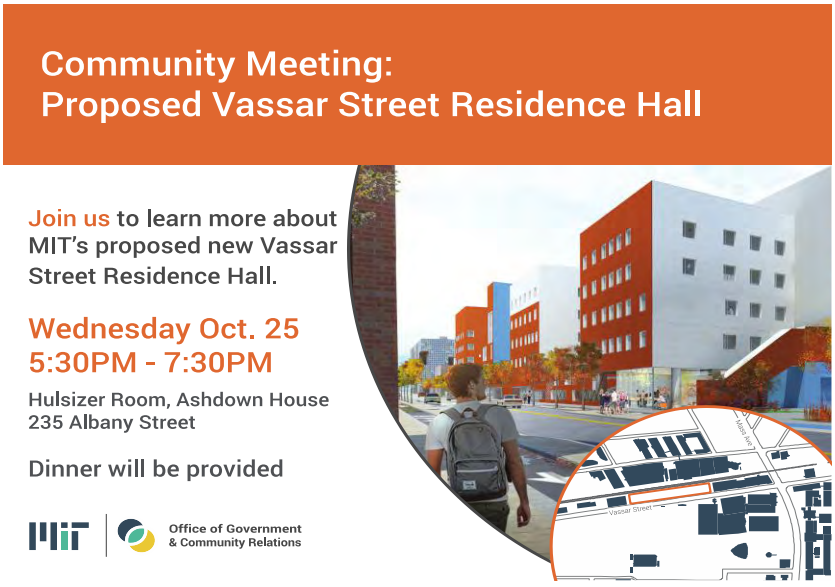
Cambridgeport Neighborhood Association ~42 attendees

MIT asked to be on the agenda of the CNA's monthly meeting. The project team provided a detailed presentation of the proposed Vassar Street residence hall by showing boards depicting the building design, specific floor layouts, overall site context, pedestrian and bicycle access, and street and sidewalk interface. MIT staff responded to questions about Institute housing, the Pacific Street railroad crossing, the Grand Junction community path, building design elements, and how the public would experience the new facility.

October 25, 2017

MIT-Hosted Community Meeting ~2 attendees

MIT posted the notice below on the Cambridgeport Listserv, Next Door, Twitter, and the City's website. The project team provided a detailed presentation of the proposed Vassar Street residence hall by showing boards depicting the building design, specific floor layouts, overall site context, pedestrian and bicycle access, and street and sidewalk interface. MIT staff responded to questions about vehicular access, the Grand Junction community path, future housing plans, and building design elements.



X. SEWER SERVICE INFRASTRUCTURE NARRATIVE

The following strategies and technologies will be employed in the plumbing design, which aid in water conservation and limiting sanitary sewer flows from the proposed building:

- Low-flow plumbing fixtures in restrooms
- Reduced or eliminated irrigation by use of native, tolerant plant species

Additionally, the site will be designed to meet the provisions of MassDEP's Stormwater Management Policy for a redevelopment project and standard engineering practices in the State of Massachusetts. Stormwater management strategies for the proposed building and site improvements will provide mitigation of stormwater runoff as required by the City of Cambridge standards (25-2 rate deduction and phosphorous removal). Mitigation measures will include the use of Cambridge-approved BMP's, underground detention/infiltration systems, deep sump catch basins, and green roofs that will help to control peak rates of runoff and quality of runoff. Also, where possible, site stormwater will be directed into landscaping or porous surfaces to promote increased infiltration.

The project sewerage service will be split into three separate service locations and will connect to the municipal systems in Vassar Street and Pacific Streets. Refer to the memorandum provided by the plumbing engineer for anticipated sewer flows from the proposed building. Storm sewer flows (roof drain connections and site drainage) from the site will be connected to the municipal storm system located in Vassar Street. Strom sewer flows for the proposed project will meet or reduce the existing flows from the project site. Both sewer and storm drainage will be connected to dedicated municipal systems. Based on discussions with the City of Cambridge DPW, the capacity and condition of the sewer and storm sewer mains in Vassar and Pacific Streets are known to be adequate and in good condition. It is not anticipated that upgrades to the existing municipal infrastructure will be required. The locations of the proposed sewer and storm drain service connections to the municipal systems will continue to be discussed and reviewed with the City of Cambridge DPW as the project moves further into design.

Attachment: MEMO from Jimmie Ng to Kathy Watkins dated Sept 19, 2017

MEMO

TO: Kathy Watkins – City of Cambridge Department of Public Works

FROM: Jimmie Ng

SUBJECT: MIT New Vassar St. Dormitory – Estimated Sewer Flows

DATE: September 19, 2017

Mr. Lush,

The proposed building is a new, 5-story dormitory with space on the ground level for a commercial kitchen and dining facility. The building's sanitary system will be split into three areas, or "clusters", and will exit the building at three different locations and connect to the municipal sewer system. The kitchen waste will be wholly separate and collect at an exterior grease interceptor, before connecting to the municipal sewer system. Refer to the site utility plan for the proposed locations.

The follow breakdown is the estimated sewer flows for this proposed project.

Cluster/Area	Kitchen	1	2	3
Peak Sewer Flow	40 gpm	165 gpm	155 gpm	140 gpm

Cluster/ Area	Kitchen	1	2	3	Totals
Daily Sewer Flow (per 310 CMR 15, Title V)	3,000 gpd	12,220 gpd	10,140 gpd	10,140 gpd	35,500 gpd
Daily Sewer Flow (Design)	3,000 gpd	5,400 gpd	4,500 gpd	4,500 gpd	17,400 gpd

Please note there is a fifth sanitary service from a sand and oil interceptor for floor drains in a loading dock. Due to its insignificant and intermittent sewer flow, it has not been included herein.

Jimmie Ng, PE
Senior Associate

XI. WATER SERVICE INFRASTRUCTURE NARRATIVE

Domestic water for the proposed building will be provided by a single connection to the municipal water system in Vassar Street. Refer to the memorandum provided by the plumbing engineer for anticipated domestic water demand for the building. Fire water service for the proposed building will be provided by a single connection to MIT fire protection infrastructure.

The following strategies and technologies will be employed in the plumbing design, which aid in water conservation and limiting water demands from the proposed building:

- Low-flow plumbing fixtures in restrooms
- Reduced or eliminated irrigation by use of native, tolerant plant species

Based on conversation with MIT and the Cambridge Water Department, there are currently no water capacity issues in the vicinity of the project site. Hydrant flow tests will be performed to determine the capacity of the water main in Vassar Street. Should it be determined that there is inadequate pressure and volume available a booster pump will be provided as part of the project to handle the deficiency. It is not anticipated that any improvements to the City owned infrastructure will be required for this project.

Attachment: MEMO from Jimmie Ng to Steven Lush dated Sept. 12, 2017

MEMO

TO: Steven Lush – Cambridge Water Department

FROM: Jimmie Ng

SUBJECT: MIT New Vassar St. Dormitory – Estimated Water Flows

DATE: September 12, 2017

Mr. Lush,

The proposed building is a new, 5-story dormitory with space on the ground level for a commercial kitchen and dining facility. The building will connect to the municipal water main in Vassar Street with a single domestic water service. The domestic water will supply the commercial kitchen, the dormitory including public areas, and an irrigation system. Refer to the site utility plan for the proposed location of the water service.

The follow breakdown is the estimated water flows for this proposed project.

Area	Kitchen	Dormitory	Irrigation
Peak Water Flow	40 gpm	340 gpm	20 gpm

Area	Kitchen	Dormitory	Irrigation
Daily Water Flow	3,500 gpd	14,400 gpd	NA

Irrigation use is estimated and the overall use is not known at this time.

Jimmie Ng, PE
Senior Associate

3 PROJECT CERTIFICATION FORMS AND APPENDIX

MIT NEW VASSAR STREET RESIDENCE

FORMS

Signed copies of the following forms to be submitted under separate cover

TRAFFIC, PARKING AND TRANSPORTATION

DEPARTMENT OF PUBLIC WORKS

TREE ARBORIST

WATER DEPARTMENT

LEED SPECIALIST

APPENDIX

LEED WORKBOOK

LEED BD+C: Homes and Multifamily v4 Workbook

Step 1.
Ensure this project is registered in LEED Online.

Step 2.
Enable macros

Note: This workbook is for use with Excel for Mac 2011 and Excel 2007 or later.

Step 3.

Unit of measure	IP units

Step 4.

Project rating system	LEED BD+C: Multifamily Midrise v4 - LEED v4
Project type	Individual
Construction type	New construction
Project team leader	Randa Ghattas, MIT
Green rater	Karla Butterfield, Steven Winter Associates, Inc.
Provider QAD	Maureen M. Mahle, Steven Winter Associates, Inc.

Step 5.
The following information must be consistent with project details in LEED Online:

Individual Project Information

Project ID #	
Project name	MIT New Residence Hall
Project address	Vassar Street
City	Cambridge
State	MA
Country	US
Zip Code	0.2139
Building type	Multifamily midrise
Number of stories	9
Number of bedrooms	350
Conditioned floor area (sq ft)	205800
Gross floor area (sq ft)	205800

Additional Resources

- Resources & Tools section of the Homes Guide to Certification (http://www.usgbc.org/cert-guide/homes#tools)
- Credit Library (http://www.usgbc.org/credits)
- For changes made to this version of the Workbook (v02), see the Form Updates section of the Addenda Database (http://www.usgbc.org/sampleforms/form-updates)

LEED BD+C: Multifamily Midrise v4 - LEED v4

Vassar Street Scorecard

Note: The information on this tab is READ-ONLY. To edit this information, see the Credit Category tabs.

Integrative Process		**Preliminary**	Y	2 of 2
IPc	**Integrative Process**			2 of 2
Location and Transportation		**Preliminary**	Y	15 of 15
LTp	Floodplain Avoidance			Required
Performance Path				
LTc	LEED for Neighborhood Development			0 of 15
Prescriptive Path				
LTc	Site Selection			8 of 8
LTc	Compact Development			3 of 3
LTc	Community Resources			2 of 2
LTc	Access to Transit			2 of 2
Sustainable Sites		**Preliminary**	Y	6 of 7
SSp	Construction Activity Pollution Prevention			Required
SSp	No Invasive Plants			Required
SSc	Heat Island Reduction			2 of 2
SSc	Rainwater Management			2 of 3
SSc	Nontoxic Pest Control			2 of 2
Water Efficiency		**Preliminary**	Y	8 of 12
WEp	Water Metering			Required
Performance Path				
WEc	Total Water Use			0 of 12
Prescriptive Path				
WEc	Indoor Water Use			5 of 6
WEc	Outdoor Water Use			3 of 4

Energy and Atmosphere

Preliminary Y 22 of 37

EAp	Minimum Energy Performance	Required
EAp	Energy Metering	Required
EAp	Education of the Homeowner, Tenant or Building Manager	Required
EAc	Annual Energy Use	21 of 30
EAc	Efficient Hot Water Distribution System	0 of 5
EAc	Advanced Utility Tracking	1 of 2

Materials and Resources

Preliminary Y 4 of 9

MRp	Certified Tropical Wood	Required
MRp	Durability Management	Required
MRc	Durability Management Verification	1 of 1
MRc	Environmentally Preferable Products	2 of 5
MRc	Construction Waste Management	1 of 3

Indoor Environmental Quality

Preliminary Y 10.5 of 18

EQp	Ventilation	Required
EQp	Combustion Venting	Required
EQp	Garage Pollutant Protection	Required
EQp	Radon-Resistant Construction	Required
EQp	Air Filtering	Required
EQp	Environmental Tobacco Smoke	Required
EQp	Compartmentalization	Required
EQc	Enhanced Ventilation	2 of 3
EQc	Contaminant Control	1 of 2
EQc	Balancing of Heating and Cooling Distribution Systems	2 of 3
EQc	Enhanced Compartmentalization	0 of 3
EQc	Combustion Venting	2 of 2
EQc	Enhanced Garage Pollutant Protection	1 of 1
EQc	Low-Emitting Products	1.5 of 3
EQc	No Environmental Tobacco Smoke	1 of 1

Innovation — Preliminary Y — 6 of 6

INp	Preliminary Rating	Required
INc	Innovation	5 of 5
INc	LEED Accredited Professional	1 of 1

Regional Priority — Preliminary Y — 3 of 4

RPc	Regional Priority	3 of 4

Point Floors

The project earned at least 8 points total in Location and Transportation and Energy and Atmosphere

The project earned at least 3 points in Water Efficiency

The project earned at least 3 points in Indoor Environmental Quality

Total — Preliminary Y — 76.5 of 110

Certification Thresholds Certified: 40-49, Silver: 50-59, Gold: 60-79, Platinum: 80-110

Multifamily Home Size Adjuster

This approach can be used to determine an overall home size adjuster for multifamily buildings, but it cannot be used to determine an overall home size adjuster for a complex with multiple multifamily buildings. If a project includes multiple multifamily buildings, each building must have its own home size adjustment. This weighted approach cannot be used for multiple single family homes.

Complete the table for each building in the project. Input the number of units and the average square footage for units with the corresponding bedroom number. For example, if the building has three 2-bedroom units that are 1300 sq ft, 1400 sq ft, and 1500 sq ft, insert "3" in cell G9 and "1400" in cell H9. Please leave zeroes or blanks where appropriate.

Building ID	0 Bedrooms		1 Bedroom		2 Bedrooms		3 Bedrooms		4 Bedrooms		5 Bedrooms		6 Bedrooms	
	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)	Number of Units	Average Floor Area (sq ft)
	231	450.00	13	480.00	2	1,855.00								
Home size adjustment	55%		52%		-16%		0%		0%		0%		0%	
Point adjustment	13.8		13.0		-4.0		0.0		0.0		0.0		0.0	
Total number of units														246
Average home size point adjustment														**13.5**

Integrative Process

Notes	Verified (initials)

Preliminary Y **2** Maybe **0** **Verified** **0**

IP Credit Integrative Process

IP Credit Integrative Process

Up to 2 points — **Preliminary** Y 2 M 0 **Verified** 0 — Responsible Party

Exemplary Performance: Achieve all three options

Option 1. Integrative Project Team (1 point)

Y 1 M V

Option 1. Integrative Project Team (1 point)

True	Team members, in addition to the builder and verification team, include capabilities in at least three of the following skill sets: architecture or residential building design; mechanical or energy engineering; building science or performance testing; green building or sustainable design; and civil engineering, landscape architecture, habitat restoration, or land-use planning.	SWA filing meeting minutes	KB
True	All team members referenced above were involved in at least three of the following phases of the design and construction process: conceptual or schematic design; LEED planning; preliminary design; energy and envelope systems analysis or design; design development; final design, working drawings or specifications; and construction.	SWA filing minutes	KB
True	Meetings were conducted with the project team at least monthly to review project status, introduce new team members to project goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.		

AND/OR

Option 2. Design Charrette (1 point)

Y 1 M V

Option 2. Design Charrette (1 point)

True	A full-day workshop (or two half-day workshops) was conducted with the project team, as defined in Option 1, no later than the design development phase.	Minutes filed	KB
08/22/17	Date(s)		
8	Duration		

AND/OR

Option 3. Trades Training (1 point)

Y 1 M V

Option 3. Trades Training (1 point)

True	At least eight hours of training on the green aspects of the project and how the trades can contribute to achieving each LEED for Homes prerequisite and attempted credit was conducted before construction but after trades have been hired for the project.		
	Date(s)		
	Duration		
	Trainer		

Location and Transportation

Notes

Preliminary Y **15** Maybe **0** **Verified** **0**

LT Prerequisite Floodplain Avoidance

LT Prerequisite Floodplain Avoidanc

Required **Required** **Verified** N

Select one of the following:

True	The project is not built on land within a flood hazard area.	Flood Map Filed
	The project is built on land within a flood hazard area and in accordance with flood provisions.	
	The project is built on land within a flood hazard area and is a previously developed building and hardscape.	

Performance Path

Performance Path

LT Credit LEED for Neighborhood Development

LT Credit LEED for Neighborhood D

15 points **Preliminary** Y 0 M 0 **Verified** 0

	Name of LEED for Neighborhood Development project	
	LEED ND project ID number	
	Rating system and version	
	LEED ND certification date	

Prescriptive Path

Prescriptive Path

LT Credit Site Selection

LT Credit Site Selection

Up to 8 points **Preliminary** Y 8 M 0 **Verified** 0

Exemplary Performance: Earn the maximum 8 points

Option 1. Sensitive Land Protection (3-4 points) Y 4 M 0 V 0 **Option 1. Sensitive Land Protection (3**

Path 1. Previously Developed (4 points) Y 4 M V Path 1. Previously Developed (4 points)

60480	Total buildable land area (acre or sq ft)	Existing Garage Removed
60480	Previously developed buildable land area (acre or sq ft)	
100.00%	Percentage of lot previously developed (%)	

Path 2. Avoidance of Sensitive Land (3 points) Y M V

Path 2. Avoidance of Sensitive Land (3 p

All new buildings, hardscapes, roads, or parking areas of the project are located on land that meets the following criteria:

	Does not consist of prime farmland, unique farmland, or farmland of statewide of local importance.	
	Was not public parkland prior to acquisition.	
	Is not in a flood hazard area shown on a legally adopted flood hazard map or otherwise legally designated by the local jurisdiction or state.	
	Is not on land specifically identified as habitat for species listed in the U.S. Endangered Species Act; the state's endangered species act; NatureServe GH, G1, or G2 lists; or those listed under local equivalent standards (for projects outside the U.S.) that are not covered by NatureServe data.	
	Is not on land within 50 ft (15 m) of wetlands or within the setback distance from wetlands prescribed by local, state or national regulations, whichever is more stringent.	
	Is not on land within 100 ft (30 m) of water bodies, including seas, lakes, rivers, streams and tributaries.	

AND/OR

Option 2. Infill Development (2 points) Y 2 M V

Option 2. Infill Development (2 points)

100.00%	Percent of land within a 1/2 mile (800 meters) from the project boundary that is previously developed	Photo filed

For projects within city limits or towns with populations less than 20,000

For projects within city limits or towns wit

	Percent of land adjacent to the project boundary that is previously developed	

AND/OR

Option 3. Open Space (1 point) Y 1 M V

Option 3. Open Space (1 point)

Select one of the following:

Yes	Built within 1/2 mile (800 meters) of open space that is at least 3/4 acres (0.3 hectares)	2 parks & 2 playing fields w/in .3 mi
(Select one)	Create publically available open space on the project site	

AND/OR

Option 4. Street Network (1 point) Y 1 M V

Option 4. Street Network (1 point)

162.00	Qualifying intersection density (intersections per square mile)	Calcs filed

AND/OR

Option 5. Bicycle Network and Storage (1 point) Y 1 M V

Option 5. Bicycle Network and Storage

Bicycle Network

Select one of the following. The project has a functional entry and/or bicycle storage within 200 yd (180 m) of a bicycle network that connects to:

Bicycle Network

Yes	At least 10 uses	Bike Lane Vassar to transit docs filed
Yes	A school or employment center	

Bicycle Storage for Multifamily Buildings

469	Number of building occupants
466	Number of residential units
	Number of short-term spaces provided
12	Number of short-term spaces required
	Number of long-term spaces provided
466	Number of long-term spaces required

Bicycle Storage for Multifamily Buildings

Design Development

LT Credit Compact Development

LT Credit Compact Development

Up to 3 points **Preliminary** Y 3 M 0 **Verified** 0

Exemplary Performance: 35 DU/acre (86.5 DU/hectare)

1.69	Buildable land area (acre)
466	Number of dwelling units
275.74	DU/acre of buildable land

Calcs filed

LT Credit Community Resources

LT Credit Community Resources

Up to 2 points **Preliminary** Y 2 M 0 **Verified** 0

Exemplary Performance: 16 uses for 1/2 point, 20 uses for 1 point.

28 Number of community resources within a 1/2 mile (800 meters) walking distance

List & Map filed

LT Credit Access to Transit

LT Credit Access to Transit

Up to 2 points **Preliminary** Y 2 M 0 **Verified** 0

Exemplary Performance: For multiple transit types, 420 weekday trips and 432 weekend trips; For commuter rail or ferry, 120 weekday trips.

For projects with multiple transit types

412	Number of weekday trips
277	Number weekend day trips

For projects with multiple transit types

Schedule & Maps filed

For projects with commuter rail or ferry service only

Number of weekday trips

For projects with commuter rail or ferry s

Sustainable Sites

Notes

Preliminary Y **6** Maybe **0.5** **Verified** **0**

SS Prerequisite Construction Activity Pollution Prevention

SS Prerequisite Construction Activit

Required **Required** **Verified** N

Confirm all of the following measures were implemented on the project, as applicable:

True	Stockpiled and protected disturbed topsoil from erosion.	Request SWPPP
True	Controlled the path and velocity of runoff with silt fencing or comparable measures.	
True	Protected on-site storm sewer inlets, streams, and lakes with straw bales, silt fencing, silt sacks, rock filters, or comparable measures.	
True	Provided swales to divert surface water from hillsides.	
True	Used tiers, erosion blankets, compost blankets, filter socks, berms, or comparable measures to stabilize soils in any area with a slope of 15% (6.6:1) or more that was disturbed during construction.	
True	Prevented air pollution from dust and particulate matter.	Request intent & strategy

For construction sites larger than 1 acre

For construction sites larger than 1 acre

Select one of the following:

True	The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to the requirements of the 2012 U.S. Environmental Protection Agency Construction General Permit (CGP).	SWPPP filed
True	The project team created an implemented an Erosion and Sedimentation Control (ESC) plan that conforms to local standards and codes, which are as or more stringent than the 2012 EPA Construction General Permit (CGP).	request SWPPP reports

SS Prerequisite No Invasive Plants

SS Prerequisite No Invasive Plants

Required **Required** **Verified**

True	No invasive plant species have been introduced into the landscape.	Request plan & list

SS Credit Heat Island Reduction

Up to 2 points	Preliminary	Y	M	Verified
		2	0	0

Option 1. Shading (1-2 points) — Y: M: V:

4000	Area of hardscape shaded by plant canopy within 10 years of planting (sq ft)

AND/OR

Option 2. Nonabsorptive Materials (1-2 points) — Y: 2 M: V:

35080	Area of ENERGY STAR qualified roof products (sq ft)
	Area of vegetated roof (sq ft)
	Area of vegetation in open pavers (sq ft)
	Area of paving materials with a 3-year aged SR value of at least 0.28 or initial SR value of at least 0.33 (sq ft)

Summary

4000	Total shaded area (sq ft)
35080	Total area of nonabsorptive materials (sq ft)
39080	Total area with shading or nonabsorptive material (sq ft)
10000	Total hardscape area (sq ft)
35080	Total roof area (sq ft)
86.69%	Percentage of area with shading or nonabsorptive material (%)

SS Credit Heat Island Reduction

Option 1. Shading (1-2 points)

Request plan & shading

Option 2. Nonabsorptive Materials (1-2

Request Spec

Summary

Request Calcs

SS Credit Rainwater Management

Up to 3 points	Preliminary	Y	M	Verified
		2	0	0

Exemplary Performance: For Case 1, manage 100% of all stormwater on-site.

Case 1. Low Impact Development (1-3 points) — Y: 2 M: V:

Permeable area as a percentage of total lot area

2,000.00	Total permeable area (sq ft)
45,080.00	Total impermeable area directed to on-site catchment or infiltration feature (sq ft)
60,480.00	Total lot area (sq ft)
77.84%	Qualifying area, as percentage of total lot area (%)

Reduction of total impermeable area

	Total impermeable area of the project (sq ft)
	Reference home size (sq ft)
0.0%	Impermeable area as a percentage of reference home size

OR

SS Credit Rainwater Management

Case 1. Low Impact Development (1-3

Request summary & plans

SWA to calculate

SS Credit Nontoxic Pest Control

SS Credit Nontoxic Pest Control

Up to 2 points

Preliminary	Y	2	M	0.5	Verified	0

Exemplary Performance: Achieve a minimum of 2 points to earn another 1/2 point for each additional strategy, up to a total of 1 point.

Select all of the following that have been included in the project.

	Install a steel mesh barrier termite control system. (1 point)	MIT IPM Policy requested
	Install a physical termite barrier system (e.g., basaltic rock) approved by code. (1 point)	
Yes	For below-grade walls, use solid concrete foundation walls, masonry walls with a course of solid block bond beam, or concrete-filled block. (0.5 point)	
	Install post-tension slabs. (0.5 point)	
	Treat all cellulosic structural material (e.g., wood framing) with a registered pesticide containing borates, following the manufacturer's directions for preconstruction treatment. (0.5 point)	
Yes	Use noncellulosic material for all structural elements. (0.5 point)	
	Install ports or openings for all plumbing elements that penetrate the slab, to allow access for inspection and treatment of pest infestations. (0.5 point)	
	Install a registered termite bait system and provide for ongoing maintenance as required by the manufacturer. (0.5 point)	
	Design a minimum 6-inch (150 millimeters) inspection space between the surface of the planned landscape grade and nonmasonry siding. (0.5 point)	
Yes	Seal all external cracks, joints, penetrations, edges, and entry points with appropriate caulking. Install rodent- and corrosion-proof screens (e.g., copper or stainless steel mesh) on all openings greater than ¼ inch (6 millimeters), except where code prohibits their installation. (0.5 point)	
Yes	Design discharge points for rain gutters, air-conditioning condensation lines, steam vent lines, or any other moisture source such that discharge is at least 24 inches (600 millimeters) from the foundation. (0.5 point)	
	Design landscape features to provide a minimum 18-inch (450 millimeters) space between the exterior wall and any plantings. (0.5 point)	
For multifamily projects		*For multifamily projects*
Yes	Develop an integrated pest management policy. The policy must include guidance for residents on pesticide use, housekeeping and prompt reporting of pest problems and incorporate policy in the Homeowner Education Manual. (Required)	

Water Efficiency

Notes

Preliminary Y **8** Maybe **1** **Verified** **0**

WE Prerequisite Water Metering

WE Prerequisite Water Metering

Required **Required** **Verified** N

Case 2. Multifamily V

Case 2. Multifamily

True A water meter or submeter is installed for each unit.

Whole Building ok

Performance Path

Performance Path

WE Credit Total Water Use

WE Credit Total Water Use

Up to 12 points **Preliminary** Y 0 M 0 **Verified** 0

Exemplary Performance: 70% reduction of indoor and outdoor water consumption

100.00% Total reduction of indoor and outdoor water consumption as calculated in the Water Reduction Calculator (%)

SWA to complete calculator

Prescriptive Path

WE Credit Indoor Water Use

Up to 6 points | **Preliminary** Y 5 M 0 | **Verified** 0

Case 2. Multifamily and Midrise Y 5 M V

Note: No additional credit is awarded if the fixtures and fittings in non-unit spaces are more efficient than those of in-unit spaces.

Meet any of the following for in-unit spaces and non-unit spaces:

Lavatory Faucet (1-2 points)

True	All installed lavatory faucets and/or faucet aerators are WaterSense labeled.
	Average rated flow volume across all lavatory faucets (gpm)

Showerheads (1-2 points)

True	All installed showerhead fixtures and fittings are WaterSense labeled.
	Average rated flow volume per shower compartment (gpm)

Toilets (1 point)

True	All installed toilet fixtures and fittings are WaterSense labeled.
	Average rated flush volume across all toilets (gpf)

Clothes Washers (1 point)

True	All clothes washers are ENERGY STAR qualified or performance equivalent

Prescriptive Path

WE Credit Indoor Water Use

Case 2. Multifamily and Midrise

Lavatory Faucet (1-2 points)

WS label spec'd

Showerheads (1-2 points)

WS label spec'd

Toilets (1 point)

WS label spec'd

Clothes Washers (1 point)

ES spec'd

WE Credit Outdoor Water Use								WE Credit Outdoor Water Use
Up to 4 points	**Preliminary**	Y	3	M	1	**Verified**	0	

0.00	Turf grass area as a percentage of landscape area (%)	Request Plans & List
100.00	Native or adapted plant area as a percentage of landscape area (%)	

Energy and Atmosphere

Notes

Preliminary Y **22** Maybe **4** **Verified** **0**

EA Prerequisite Minimum Energy Performance

EA Prerequisite Minimum Energy Pe

Required **Required** **Verified** N

Whole-Building Energy Simulation

Whole-Building Energy Simulation

	Target Finder. Enter energy performance rating target (kBtu/sq ft per year)
True	The project meets the mandatory requirements of ASHRAE 90.1-2010, Sections 5.4, 6.4, 7.4, 8.4, 9.4 and 10.4
18	Total energy cost savings (%)

Commissioning

Commissioning

Option 1. Commissioning using ENERGY STAR Protocols. V

Option 1. Commissioning using ENER

True	The project meets the ENERGY STAR Qualified Multifamily High Rise Buildings Testing and Verification Protocols.

OR

Option 2. Commissioning using Prescriptive Path V

Option 2. Commissioning using Presc

1. Reduced Heating and Cooling Distribution System Losses for In-Unit HVAC

	Duct leakage rate does not exceed 4.0 cfm25 per 100 sq ft (1.2 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	Duct leakage rate in units smaller than 1,200 sq ft (110 sq m) does not exceed 6.0 cfm25 per 100 sq ft (1.7 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	Total duct leakage rate in-units systems does not exceed 8.0 cfm25 per 100 sq ft (2.4 cmm at 25 Pa per 100 sq m) of conditioned floor area.
	The air-handler unit and ductwork are visbly within the unit's envelope.

2. Fundamental Commissioning of Central HVAC Systems

	The project meets the performance testing and ongoing maintenance requirements of LEED v4 New Construction EA Prerequisite Fundamental Commissioning and Verification for central commercial heating, cooling, water heating and ventilation systems.

3. Construction Document Specifications

	The following details were included in the bid documents: Elements to be sealed, air barrier sheet and compartmentalization sheet.

4. LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist

	The LEED for Homes Multifamily Midrise Thermal Enclosure Inspection Checklist has been completed.

	The project is a certified Passive House project.

EA Prerequisite Energy Metering

Required	**Required**	**Verified**	N	**EA Prerequisite Energy Metering**
Case 2. Multifamily		V		**Case 2. Multifamily**
True	Electric submeters are installed in each residential unit.			Monitoring capable dorm
Whole building	A whole-building gas meter or submeter for each residential unit is installed.			

EA Prerequisite Education of Homeowner, Tenant, or Building Manager

Required	**Required**	**Verified**		**EA Prerequisite Education of Homec**
True	An operations and maintenance manual, binder, or CD has been/will be provided to all individuals or organizations responsible for the maintenance of the home.			
True	A minimum one-hour walkthrough of the home with the occupants has been conducted.			

EA Credit Annual Energy Use

Up to 30 points	Preliminary	Y	M	V
		21	3	0

Exemplary Performance: 65% or better reduction from ASHRAE 90.1-2010.

18.00%	Percent reduction from ASHRAE 90.1-2010
13	Points earned
8.0	Average home size point adjustment (from the Multifamily HSA tab or from the Batch - Multifamily tab)
21.0	Final points earned

ASHRAE model filed

EA Credit Efficient Hot Water Distribution System

Up to 5 points	Preliminary	Y	M	Verified	V
		0	0		0

Option 1. Efficient Hot Water Distribution (2 points) — Y: 0, M: 0, V: 0

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

For projects using circulating systems

(Select one)	Circulating pump does not operate continuously, is on a timer, or is on a water temperature sensor.
(Select one)	Circulating pump is demand activated by a momentary contact switch, motion sensor, flow switch, door switch or voice command.
(Select one)	After the pump starts, the controls allow the pump to operate until the water temperature in the return pipe rises not more than 10ºF (6 ºC) above the initial temperature of the water in the pipe. Controls limit the water temperature to a maximum of 105ºF (40 ºC). Controls limit pump operation to not more than 5 minutes per activation in the event that both means of shutting off the pump have failed.
(Select one)	Circulating hot water systems have with an automatic or readily accessible manual switch to turn off the hot water circulating pump when not in use.

For projects using heat-traced piping systems

For projects using heat-traced piping sys

(Select one) Piping is insulated.

Path 1. Maximum Allowable Pipe Length (2 points) Y M V

Path 1. Maximum Allowable Pipe Length

Pipe or tube length installed (ft)

Nominal pipe size (in)

Maximum pipe or tube length allowed for water heaters, boilers with no circulation loop or heat traced pipe or in multifamily buildings a central circulation loop or heat traced pipe (ft)

Maximum pipe or tube length allowed for circulation loop or heat traced pipe serving a single unit or house (ft)

OR

Path 2. Maximum Allowable Pipe Volume (2 points) Y M V

Path 2. Maximum Allowable Pipe Volume

Volume of hot or tempered water from source to termination (oz)

OR

Option 2. Performance Test (3 points) Y 0 M 0 V 0

Option 2. Performance Test (3 points)

Note: Projects using heat traces that serve a single unit or house are awarded only half credit.

Case 1. Hot water source is a water heater or boiler with no circulation loop or heat traced pipe; or in multifamily buildings a central circulation loop or heat traced pipe. Y M V

Case 1. Hot water source is a water heat

(Select one) Meets WaterSense Labeled New Homes requirements

Tested volume of water stored in piping (gal)

OR

Case 2. Hot water source is a circulation loop or heat traced pipe serving a single unit or house Y M V

Case 2. Hot water source is a circulation

Tested volume of water stored in piping (gal)

For projects using heat-traced piping systems

For projects using heat-traced piping sys

(Select one) Piping is insulated.

OR

Option 3. Pipe Insulation (2 points) Y M V

Option 3. Pipe Insulation (2 points)

Insulation R-value

EA Credit Advanced Utility Tracking

EA Credit Advanced Utility Tracking

Up to 2 points — **Preliminary** Y 1 M 1 **Verified** 0

Exemplary Performance: Meter separate energy usage information for at least four end uses.

Option 1. Electric and Water (1 point) Y 1 M V

Option 1. Electric and Water (1 point)

Select one of the following:

True — A permanent energy-monitoring system that records at intervals of one hour or less has been installed in each unit.

Monitoring, real time outputs

True — The project has an automatic in-ground irrigation system and landscaped irrigated area larger than 1,000 sq ft (93 sq m) and has installed a submeter to monitor all irrigation system components.

AND/OR

Option 2. Third-Party Utility Reporting (1 point) Y 0 M 1 V 0

Option 2. Third-Party Utility Reporting

Path 1. Whole-Building Master Meter Y 0 M 1 V

Path 1. Whole-Building Master Meter

True — The building owner has shared all applicable utility data with USGBC via a USGBC-approved third-party.

Anticipated

OR

Path 2. Individual Unit Meters Y M V

Path 2. Individual Unit Meters

(Select one) — At least 50% of unit owners or occupants have shared all applicable utility data with USGBC via a USGBC-approved third-party.

Materials and Resources

Notes

Preliminary Y **4** Maybe **3** **Verified** **0**

MR Prerequisite Certified Tropical Wood

MR Prerequisite Certified Tropical W

Required **Required** **Verified** N

True	All wood in the building is nontropical, reused or reclaimed, or certified by the Forest Stewardship Council, or USGBC-approved equivalent.	Letter of agreement by RP

MR Prerequisite Durability Management

MR Prerequisite Durability Managem

Required **Required** **Verified** N

True	ENERGY STAR for Homes, version 3, water management system checklist is collected from builder.	

Confirm all of the following have been implemented on the project:

True	Nonpaper-faced backer board, or a product or coating over wallboard that meets standard ASTM D 3273 standard, was installed on the area above bathtub, spa or shower, and in areas behind fiberglass enclosures where wallboard is installed.	
True	Water-resistant flooring was installed in the kitchen, bathroom(s), laundry room, spa area(s). No carpet was installed in these areas.	
True	Water-resistant flooring was installed in entryways within 3 feet of exterior door(s).	
N/A	A drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for all tank water heaters in or over living space.	
True	A drain and drain pan, drain pan and automatic water shut-off or flow restrictors, or floor drain with floor sloped to drain was installed for clothes washer in or over living space.	
False	Conventional clothes dryers exhaust directly to outdoors.	

MR Credit Durability Management Verification

MR Credit Durability Management Ve

1 point | **Preliminary** Y 1 M 0 | **Verified** 0

True	Each measure in the ENERGY STAR for Homes, version 3, water management system builder checklist was verified by the verification team.	SWA to review throughout

MR Credit Environmentally Preferable Products

MR Credit Environmentally Preferab

Up to 5 points | **Preliminary** Y 2 M 3 | **Verified** 0

Exemplary Performance: For Option 2, achieve a minimum of 4 points to earn another 2 points for purchasing products that meet the requirements.

Option 1. Local Production | **Preliminary** Y 1 M | **Verified**

Option 1. Local Production

Select which the following were extracted, processed, and manufactured within 100 miles (160 km) of the project site:

	Percentage of locally produced framing (%) (0.5 point)	
50.00	Percentage of locally produced aggregate for concrete and foundation (%) (0.5 point)	Anticipated
50.00	Percentage of locally produced drywall and interior sheathing (%) (0.5 point)	Anticipated

AND/OR

Option 2. Environmentally Preferable Products | **Preliminary** Y 1 M 3 | **Verified**

Option 2. Environmentally Preferable I

Select the criteria met by at least 90% of the component:

No Floor Covering (2 points)		SWA reviewing submittals
Floor Covering (1 point)	At least 25% postconsumer or 50% preconsumer recycled content	
Insulation (1 point)	At least 25% postconsumer or 50% preconsumer recycled content	
Sheathing (1 point)		
Framing (1 point)		
Drywall (1 point)		
Concrete (1 point)	Concrete with at least 30% fly ash/slag and 50% recycled content aggregate	
Roofing (1 point)		
Siding (1 point)		

Select criteria met for at least 3 of the following additional components by at least 90% of the component (1 point):

Doors	
Cabinets	Extended producer responsibility
Counters	At least 25% postconsumer or 50% preconsumer recycled content
Interior Trim	
Decking/Patio	
Windows	

SWA reviewing submittals

MR Credit Construction Waste Management

MR Credit Construction Waste Mana

Up to 3 points **Preliminary** Y 1 M 0 **Verified** 0

Exemplary Performance: For renovation projects, track and divert at least 50% of demolition waste.

	Baseline waste allowance (lbs)
	Waste to landfill (lbs)
	Recycled waste (lbs)
0.00	Total waste (lbs)
0.00%	Percent reduction below baseline (%)

Request strategy & calcs

Indoor Environmental Quality

Notes	Verified (initials)

Preliminary Y **10.5** Maybe **2.5** **Verified** **0**

EQ Prerequisite Ventilation

Required **Required** **Verified** N

Responsible Party

Case 2. Multifamily V

Case 2. Multifamily

Local Exhaust

Confirm all of the following have been implemented on the project:

Local Exhaust

True	Local exhaust systems meeting the requirements of ASHRAE Standard 62.2–2010, Sections 5 and 7 or local equivalent, whichever is more stringent, were installed in all bathrooms (including half-baths) and the kitchen.		
True	Local exhaust systems exhaust air directly to the outdoors.		
True	All bathroom exhaust fans are ENERGY STAR-labeled or an HRV or ERV is used.		
True	For exhaust hood systems capable of exhausting in excess of 400 cubic feet per minute (188 liters per second), makeup air is provided at a rate approximately equal to the exhaust air rate. Makeup air systems have a means of closure and can be automatically controlled to start and operate simultaneously with the exhaust system.		

Whole Unit Mechanical Ventilation

Whole Unit Mechanical Ventilation

True	The project meets ASHRAE Standard 62.2-2010 Sections 4 and 7 or local equivalent, whichever is more stringent.	Balanced throughout, ERV's resident roo	KB

Non-Unit Spaces

True	The project meets the minimum requirements of ASHRAE Standard 62.1-2010 Sections 4 -7 or local equivalent, whichever is more stringent.
True	The project is located in a nonattainment area for PM2.5. The project has installed MERV 11 or higher filters.
True	The project is located in a nonattainment area for ozone.

EQ Prerequisite Combustion Venting

Required	Required	Verified	N

True	No unvented combustion appliances were installed (ovens and ranges excluded).
True	A carbon monoxide (CO) monitor is installed on each floor, hard-wired with a battery backup.

For projects with fireplaces or woodstoves installed

N/A	Provide doors that close or a solid glass enclosure.
N/A	Closed-combustion, power-vented or passes BPI or RESENT combustion safety protocols

For projects where space and water heating equipment involving combustion are installed

Select one of the following:

True	Equipment is installed with closed combustion (i.e. sealed supply air and exhaust ducting)
True	Equipment is installed with power-vented exhaust
True	Equipment is located in a detached utility building or open-air facility

EQ Prerequisite Combustion Venting

Responsible Party

	KB
SWA to verify locations	

For projects with fireplaces or woodstoves installed

For projects where space and water heating equipment invo

EQ Prerequisite Garage Pollutant Protection

Required	Required	Verified	N

	All air-handling equipment and ductwork is placed outside the fire-rated envelope of the garage.
	Shared surfaces between the garage and conditioned spaces are tightly sealed.

Conditioned Spaces Above Garage

	All penetrations and all connecting floor and ceiling joist bays are sealed.

Conditioned Spaces Next to Garage

	All doors are weather-striped.
	Carbon monoxide detectors are installed in rooms that share a door with the garage
	All penetrations and all cracks at the base of the walls are sealed.

EQ Prerequisite Garage Pollutant Protection

Responsible Party

No Garages	

Conditioned Spaces Above Garage

Conditioned Spaces Next to Garage

EQ Prerequisite Radon-Resistant Construction

Required | **Required** | **Verified** N

Exemplary Performance: For projects in radon zones 2 and 3, install a qualifying passive radon ventilation system.

Case 1. New Construction V

1.00 EPA radon zone

For projects in EPA radon zone 1

True	There is a capillary break per the Indoor airPLUS specifications.
True	An electrical outlet has been provided near vent piping in the attic to facilitate future fan installation.
True	A gas-tight vertical vent pipe extending up through the conditioned spaces and terminating above the roof opening has been installed.

OR

The house is elevated by at least 2 feet (600 millimeters) with open air space between building and ground or there is a garage under the building.

OR

Case 2. Renovation of Existing Building V

EPA radon zone

For renovation projects in EPA radon zone 1 with no slab work being performed

Radon test results (pCi/L)

If results are greater than 4 pCi/L, an active ventilation system has been installed.

EQ Prerequisite Radon-Resistant Construction

Responsible Party

Case 1. New Construction

Request Radon Mitigation plans	KB

For projects in EPA radon zone 1

Case 2. Renovation of Existing Building

EQ Prerequisite Air Filtering

Required | **Required** | **Verified** N

MERV rating of filters on recirculating space conditioning systems

MERV rating of filters on mechanically supplied outdoor air systems with 10 ft (3 m) or more of ductwork

EQ Prerequisite Air Filtering

Responsible Party

EQ Prerequisite Environmental Tobacco Smoke

Required | **Required** | **Verified** N | Responsible Party

For multifamily projects

True	Smoking is prohibited in all common areas of the building.	
True	Smoking is prohibited outside the project building(s) except in designated smoking areas located at least 25 ft (7.5 m) from all entries, outdoor air intakes, and operable windows.	
True	Signage communicating the smoking policy has been installed.	

EQ Prerequisite Compartmentalization

Required | **Required** | **Verified** N | Responsible Party

For multifamily and attached single-family projects

True	Each residential unit has sealed penetrations through walls, ceilings, and floors and vertical chases adjacent to units.	
True	All doors in the residential units leading to common hallways have weather-stripping.	
True	All exterior doors and operable windows have weather-stripping..	
	Blower door test results (cfm50)	
	Envelope enclosure area (sq ft)	
0.00	Leakage per area of enclosure (cfm50/sq ft)	

EQ Credit Enhanced Ventilation

Up to 3 points | **Preliminary** Y 2 M 0 | **Verified** 0 | Responsible Party

Option 1. Enhanced Local Exhaust (1 point) Y M V

	Bathroom exhaust fan control type in every bathroom with a shower, bathtub, or spa	

AND/OR

Option 2. Enhanced Whole-House Ventilation (2 points) Y 2 M V

True	A balanced whole-house ventilation system was designed and installed that meets ASHRAE 62.2-2010 sections 4 and 7 in each home or unit.	
True	The system does not exceed ASHRAE 62.2-2010 requirements by more than 10%.	

EQ Credit Contaminant Control									EQ Credit Contaminant Control	
Up to 2 points	**Preliminary**	Y	1	M	1	**Verified**	0			Responsible Party
Exemplary Performance: Achieve a minimum of 2 1/2 points to earn another 1/2 point.										
Option 1. Walk-off Mats (0.5 point)		Y	0.5	M		V			**Option 1. Walk-off Mats (0.5 point)**	
	For all primary entryways, a permanent walk-off mat that is at least 4 feet (1.2 meters) long and allows access for cleaning has been installed.									KB
For multifamily projects										
True	For exterior entryways in common areas, permanent systems that are at least 10 feet (3 meters) long have been installed.									
AND/OR										
Option 2. Shoe Removal and Storage (0.5 point)		Y		M		V			**Option 2. Shoe Removal and Storage (0.5 point)**	
(Select one)	A shoe removal and storage space is near the primary entryway.									
(Select one)	No conventional carpet is installed in shoe removal and storage area.									
AND/OR										
Option 3. Preoccupancy Flush (0.5 point)		Y	0.5	M		V			**Option 3. Preoccupancy Flush (0.5 point)**	
	The project has earned the EPA Indoor airPLUS label								submit strategy	KB
	OR									
True	At installation, all permanent ducts and vents were sealed to maximize contamination from construction.									
After construction ends and before occupancy									After construction ends and before occupancy	
True	Any dust and debris was removed from ducts.									
True	The home was flushed out for 48 hours, with all windows open, a fan run continuously or all HVAC fans and exhaust fans.									
AND/OR										
Option 4. Air Testing (1 point)		Y	0	M	1	V			**Option 4. Air Testing (1 point)**	
True	The building was tested for indoor air contaminants and maximum concentrations were not exceeded.								researching feasiblity	

EQ Credit Balancing of Heating and Cooling Distribution Systems

Up to 3 points	Preliminary	Y	M	Verified	Responsible Party
		2	0	0	

		Y	M	V	EQ Credit Balancing of Heating and Cooling Distributi
Case 1. Forced-Air Systems		2	0	0	**Case 1. Forced-Air Systems**
Option 1. Multiple Zones (1 point)		1			Option 1. Multiple Zones (1 point)
	A system with at least two space-conditioning zones with independent thermostatic controls has been installed.				
	OR				
True	The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).				
AND/OR					
Option 2. Supply Air-Flow Testing (1 point)		1	0		Option 2. Supply Air-Flow Testing (1 point)
True	The supply air-flow rates are within +/- 20% (or +/- 25 cfm or 11 lps) of calculated values from ACCA Manual J.				SWA to review 3rd party TAB — KB
AND/OR					
Option 3. Pressure Balancing (1 point)		0			Option 3. Pressure Balancing (1 point)
	The pressure differential between bedroom and rest of the house is less than 3 Pa.				
OR					
Case 2. Radiative Systems		0	0	0	**Case 2. Radiative Systems**
Option 1. Multiple Zones (1 point)					Option 1. Multiple Zones (1 point)
	A system with at least two zones with independent thermostatic controls has been installed				
	Each zone has a separate loop and pump controlled automatically by a thermostat control.				
	OR				
	The project is a single family home less than 800 sq ft (74 sq m) or a multifamily building whose average unit size is less than 1,200 sq ft (110 sq m).				
AND/OR					
Option 2. Room-by-Room Controls (2 points)					Option 2. Room-by-Room Controls (2 points)
(Select one)	Room-by-room thermostatic controls are installed.				

EQ Credit Enhanced Compartmentalization

Up to 3 points	Preliminary	Y	M	Verified	Responsible Party
				0	

		EQ Credit Enhanced Compartmentalization
0.00	Leakage per area of enclosure (cfm50/sq ft)	

EQ Credit Combustion Venting

EQ Credit Combustion Venting

Up to 2 points	**Preliminary**	Y	2	M	0	**Verified**	0	Responsible Party

Option 1. No Fireplace or Woodstove (2 points)	Y	2	M		V		**Option 1. No Fireplace or Woodstove (2 points)**

True	No fireplaces or woodstoves have been installed.		KB

OR

Option 2. Enhanced Combustion Venting Measures (1 point)	Y		M		V		**Option 2. Enhanced Combustion Venting Measures (1 p**

	The project has earned the EPA Indoor airPLUS label		
	OR		
	EPA qualified wood- or pellet-burning fireplaces with either power or direct venting have been installed.		
	A natural gas, propane, or alcohol stove approved by a safety testing facility and has power or direct venting has been installed.		
	A natural gas, propane, or alcohol stove has a permanently fixed glass front or gasketed door and an electronic pilot.		

EQ Credit Enhanced Garage Pollutant Protection

1 point | **Preliminary** Y 1 M 0 | **Verified** 0

	Option 1. Exhaust Fan on Controls in Garage (1 point)	Y	M	V
(Select one)	All of the requirements in ASHRAE 62.1-2010 for garage ventilation have been met.			
(Select one)	The garage has sufficient exhaust to create negative pressure with respect to adjacent spaces with the doors to the garage closed.			
(Select one)	Self-closing doors have been installed. Deck-to-deck partitions or a hard lid ceiling have been installed.			
(Select one)	The exhaust fan either runs continuously or is on a carbon monoxide sensor that turns on the fan when ambient CO levels reach 35 ppm.			

OR

	Option 2. Detached Garage or No Garage or Carport (1 point)	Y 1	M	V
True	No garage has been constructed.			
	A detached garage has been constructed			

EQ Credit Enhanced Garage Pollutant Protection

Responsible Party

Option 1. Exhaust Fan on Controls in Garage (1 point)

Option 2. Detached Garage or No Garage or Carport (1 p

KB

EQ Credit Low-Emitting Products

Up to 3 points | **Preliminary** Y 1.5 M 1.5 | **Verified** 0

Select all that apply. At least 90% of a component must meet the requirement:

True	Site-applied interior paints and coatings have been tested and meet the requirements of CA Section 01350. (0.5 point)	SWA to review submittals	KB
True	Flooring has been tested and meets the requirements of CA Section 01350. (0.5 point)		
True	Insulation has been tested and meets the requirements of CA Section 01350. (0.5 point)		
True	Site-applied adhesives and sealants have been tested and meet the requirements of CA Section 01350. (0.5 point)		
True	Composite wood products have been tested and meet the California Air Resources Board requirements for ultra-low-emitting formaldehyde (ULEF) resins or no-added formaldehyde based resins. (1 point)		

EQ Credit Low-Emitting Products

Responsible Party

EQ Credit No Environmental Tobacco Smoke

1 point | **Preliminary** Y 1 M 0 | **Verified** 0

True	Smoking is prohibited throughout the building, including within living units.	SWA to review policy	KB
True	The prohibition is communicated to tenants through building rental or lease agreements or in condo or co-op association covenants. Restrictions and provisions for enforcement are also included.		

EQ Credit No Environmental Tobacco Smoke

Responsible Party

Innovation

Preliminary Y **6** Maybe **0** **Verified** **0**

IN Prerequisite Preliminary Rating

Required **Required** **Verified** N

True — Preliminary rating and meeting are complete.

IN Credit Innovation

Up to 5 points **Preliminary** Y 5 M 0 **Verified** 0

Option 1. Innovation (1 point) Y 1 M V

Describe the intent of the proposed innovation credit.

Enhanced CX

AND/OR

Option 2. Pilot (1 point) Y 1 M V

Design for Adaptability — Pilot credit name

AND/OR

Option 3. Additional Strategies (0.5-3 points) Y 3 M V

Exemplary Performance ID all strategies achieved (1 pt)	Strategy Credit name
Exemplary Performance LT Community Resources +28 locations (1 pt)	Strategy Credit name
Pilot Active Design	Strategy Credit name
Innovation Occupant Comfort Survey	Strategy Credit name
Innovation Green Power & Carbon Offset	Strategy Credit name
Exemplary Performance 275 units/acre	Strategy Credit name

IN Credit LEED Accredited Professional

1 point **Preliminary** Y 1 M 0 **Verified** 0

LEED AP BD+C Homes — Name of credential holder

Regional Priority

Notes

Preliminary Y **3** Maybe **1** **Verified** **0**

RP Credit Regional Priority

RP Credit Regional Priority

Up to 4 points **Preliminary** Y 3 M 1 **Verified** 0

Regional priority credits may be found on www.usgbc.org/rpc.

Regional Priority Credit Name	Zone	
Annual Energy Use (need 15pts) - ANTICIPATE 26PT, YES	5	See EA Tab ASHRAE savings + HAS
Compact Development with >275 units/acre (need>80), 1 point, YES		See LT Tab, 275 units/acre compact dev
Heat Island Reduction (need 2pt) - ANTICIPATE 2PT, YES		See LT Tab, earned max +8 pts, 1 pt
Rainwater Management (need 3pt) - ANTICIPATE 2PT, NO		
Nontoxic Pest Control (need 2pts) - ANTICIPATE 1.5PT, NO		
Balancing Heating & Cooling Distribution (need 3 pt) - ANTICIPATE 2PT, NO		