2. SUSTAINABILITY

NARRATIVE

The Green Engineer, Inc.

Sustainable Design Consulting

Article 22: Green Building Report Submitted for Review: August 17, 2018

Commercial Building B 325 Main Street



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Appendix A LEEDv4 CS Project Scorecard (target)

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I. PROJECT DESCRIPTION

Commercial Building B at 325 Main Street, part of the MXD Infill Development Concept Plan within the Kendall Square Urban Renewal Plan (KSURP), is meeting the Design Review Filing application requirement with a minimum of LEED Gold certification under the LEEDv4 Core and Shell rating system. The project scorecard will develop over the course of design, possible points may be achieved, and any updates to this report will be included in the Building Permit application.

Commercial Building B at 325 Main Street is part of the infill development concept plan, a major urban mixed-use project set within the 43-acre KSURP. Phase 1 will include demolition of the existing 3 Cambridge Center commercial office building to be replaced with the new construction of Commercial Building B at 325 Main Street—a 16 story commercial office building with ground and second floor active and/or retail space of approximately 410,982 square feet.

II. AFFIDAVIT

I, Allison Zuchman, do hereby affirm that I have thoroughly reviewed the supporting documents for LEEDv4 Core and Shell rating system and confirm that Commercial Building B at 325 Main Street meets the requirement for Gold with 60 points and 16 possible ('maybe') points. Commercial Building B at 325 Main Street, Cambridge, MA has been designed to meet the green building requirement under Article 22.20 of the Cambridge Zoning Ordinance.

Allison Zuchman, The Green Engineer, Inc. LEED Administrator and Sustainability Consultant Registered 12/22/2009





III. LEEDv4 CORE AND SHELL SCORECARD SUMMARY

- (CS) Project Scorecard in Appendix A.
- B. The Project anticipates attaining the Gold Certification threshold of 60 credit points by consideration as the design continues to evolve.

LEED CREDIT SUMMARY	Yes	Maybe
Integrative Process	1 point	0 possible points
Location and Transportation	14 points	5 possible points
Sustainable Sites (SS)	5 points	3 possible points
Water Efficiency (WE)	6 points	0 possible points
Energy & Atmosphere (EA)	16 points	4 possible points
Materials & Resources (MR)	6 points	2 possible points
Indoor Environmental Quality (EQ)	5 points	0 possible points
Innovation in Design (ID)	4 points	2 possible points
Regional Priority (RP)	3 points	0 possible points
Total Points	60 points	16 possible points

IV. LEED Credit Narrative

The project meets the LEEDv4 Core and Shell Minimum Program Requirements and each of the required Prerequisites.

General Project Information

SITE AND BUILDING AREA	
Total Site Area within the LEED	34,136 sf
Project Boundary (LPB)	
Total Building Area	410,982 sf
Commercial	343,123 GFA sf
Retail	42,300 GFA sf
Basement / Storage	25,559 sf
Building Footprint	30,736 sf
TRANSPORTATION	
Parking Spaces	Parking provided in adjacent garage
Long-Term Bike Storage	LEED requirement: 73 spaces (108 provided).
Short-Bike Storage	LEED requirements: 9 spaces (47 provided).
OCCUPANCY (Per LEED BD+C Refere	ence Guide, Core & Shell Appendix 1)
Commercial FTE (250/sf)	1,450
Commercial Transients (0/sf)	0
Retail FTE (550/sf)	77
Retail Transients (130/sf)	326

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A. Please refer to the LEED credit summary below and the attached LEEDv4 Core and Shell

attempting **60** credit points. Additionally, the project has earmarked an additional **16** possible 'maybe' credit points that require further research; these credits will remain under

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A. Integrative Process (IP)

IP Credit 1 Integrative Process 1 credit point The project will meet the intent of this credit through identification of cross discipline opportunities to design a sustainable building project. Sustainable design focused meetings were held early and will be ongoing throughout the design process to assist the team in establishing shared sustainable design and energy efficiency goals for the project. Early design phase energy modeling has been conducted to review systems synergies and assess areas where energy loads may be significantly reduced. A water use analysis was conducted to aid in establishing water use reduction targets.

B. Location and Transportation (LT)

LT Credit 2 Sensitive Land Protection 2 credit points The project will meet the credit requirements by locating the building on land that has been previously developed.

LT Credit 3 High Priority Site

2 credit points The project will meet the credit requirements by locating the building on a site in a U.S. Department of Housing and Urban Development's Qualified Census Tract.





LT Credit 4 Surrounding Density and Diverse Uses The project will meet Option 1 for Surrounding Density by being located in an area with an average density greater than 35,000 sf/acre. Additionally, the project will meet Option 2 for Diverse Uses by being located within ½ mile walking distance of at least 8 publicly available diverse uses in at least three separate use categories.

What's Nearby > 325 Main Street Panda Expres Coffee: Calle Alla Par Kendall Square, Cambridge, 02142 Commute to Downtown Boston Bars: Tap N Tap mi) while 6 min while 14 min 20 16 min 3 4 Very Walkable 86 Schools

The project is located within 1/2 mile of the following 8 diverse uses:

Category	Use Type	Number	Business Name	Distance
Community serving	Convenience Store	1	Fresh Mart	0.4
retail	Other retail	2	The Garment District	0.4
	Bank	3	Webster Bank	0.2
	Gym	4	Bodyscapes Fitness Kendall Square	0.3
Services	Hair care	5	Coop Hair Styling	0.1
	Laundry or dry cleaner	6	Clevergreen Cleaners	0.4
	Restaurant	7	Bailey & Sage	0.05
Civic and Community	Child care	8	TSC Child Care Center	0.2
Facilities	Post office	9	US Post Office	0.2

LT Credit 5 Access to Quality Transit

3 credit points, 3 maybe points The Kendall/MIT MBTA station is located less than 0.1 miles walking distance from the closest functional entry of the project building. Additionally, stops for MBTA Bus lines 64, 68, 85 CT2, the EZ Ride, and CambridgeSide Galleria shuttle are located within 0.1 miles walking distance from the closest function entry of the project. In total, the project provides occupants with a total of 353 weekday transit rides and 187 weekend transit rides within ¼ mile walking distance.

6 credit points



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The MBTA intends to replace the entire fleet of existing Red Line rolling stock in the coming years, which is expected to significantly increase its operating capacity and efficiency. If the new Red Line cars become operational within 2 years of the project's certificate of occupancy, the project would likely be eligible to achieve 3 additional credit points for providing a sufficient number of additional rides to reach the highest credit threshold.



LT Credit 6 Bicycle Facilities

1 maybe point

Exterior short-term and covered long-term bicycle storage is planned for visitors and regular occupants of the project. The immediate neighborhood provides a direct connection to a local bicycle network that links to a variety of services with pedestrian and cyclist access.

The project will meet City of Cambridge requirements for bike storage, which are more stringent than the LEEDv4 LTc6 Bicycle Facilities requirements. At minimum, 73 covered, longterm bike storage spaces and 9 short-term storage spaces (within 100 feet of the building entrance) will be provided to meet LEED requirements.



LTc Bicycle Facilities - Bike Racks					
Bike Racks	Short-Term (no < 4)	Long-Term (no < 4)			
2.5% of peak visitors	9	0			
5% of all regular building occupants	0	73			
TOTAL REQUIRED BIKE CAPACITY	9	73			

The office tenant is considering providing showers with changing facilities for office occupants and the project is considering providing showers with changing facilities for retail tenants.

LTc Bicycle	Facilitie
	Showers/
General Office	
Retail, general	C
TOTAL RE	QUIRED S

LT Credit 7 Reduced Parking Footprint

There is no parking within this building or the LEED Project boundary. Parking for this building is provided in the adjacent existing Green Garage. The total existing off-street parking capacity for the Green Garage is 824 parking spaces. The total parking capacity demonstrates a 25% reduction below the base ratios recommended by the Parking Consultants Council (1,108 spaces). The project may provide preferred carpool parking for at least 37 spaces in addition to the 5 existing carpool spaces for a total of 42 (5% of the total parking capacity). Further investigation and location of preferred parking spaces to be determined. Credit compliance to be confirmed as the project develops.

LT Credit 8 Green Vehicles

parking quantity, the project will provide:

- for a total of 17 (2% of total parking capacity).

LT Reduced Parking Footprint and Green Vehicles							
Total Parking Spaces	5% Green Vehicle Parking Spaces	2% Charging Stations	5% Carpool Parking Spaces				
	42 Total Req.	17 Total Req.	42 Total Req.				
824	39 Existing	4 Existing	5 Existing				
	3 New	13 New	37 New				

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- Showers/Changing Rooms							
Changing Roo	ms						
	10						
	1						
OWERS	11						

1 maybe point

1 credit point 824 parking spaces are currently provided within the existing Green Garage. Based on this

1. At least 3 LEFE spaces in addition to the 39 existing LEFE spaces for a total of 42 (5% of total parking capacity) located in preferred locations throughout the parking garage. 2. At least 13 electric vehicle charging stations (EVCS) in addition to the 4 existing EVCS

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C. Sustainable Sites (SS)

SS Prerequisite 1: Construction Activity Pollution Prevention Required The construction manager will be required to submit and implement an appropriate SWPPP/Erosion and Sedimentation Control (ESC) Plan for construction activities related to the construction of the project. The ESC Plan will conform to the erosion and sedimentation requirements of the applicable NPDES regulations and specific municipal requirements for the City of Cambridge. Additionally, the ESC Plan will address management and containment of dust and particulate matter generated by on site demolition and construction activities. Civil design drawings will include measures for the implementation of the ESC plan.

SS Credit 1: Site Assessment

1 credit point

A comprehensive site assessment was completed as part of the MXD Infill Development Concept Plan. The design team will continue to study topography, hydrology, climate, vegetation, soils, human use, and human health effects specific to Commercial Building B at 325 Main Street to inform the design.

SS Credit 4 Rainwater Management 3 maybe points Due to tight constraints and limited scope of site work, the project will likely have difficulty managing 100% of stormwater for the 95th percentile of local rainfall events on-site. However, the project will implement a stormwater management plan that decreases the volume of stormwater runoff and that captures and treats runoff using acceptable best management practices (BMP's).

A combination of natural and structural BMP measures may be designed for the site. Rainwater control measures will be investigated, engineered and refined as the project undergoes the design development process.

The Project will comply with the Mass DEP Stormwater Management Policy, as well as reduce the peak rate and total volume of runoff for the 25-year design storm in the post-development condition to meet the two-year predevelopment condition, as required by Cambridge Department of Public Works (CDPW). In addition to mitigating runoff flow rates and volumes, the Project will also reduce Phosphorus loads from the project site to the CDPW stormwater infrastructure to comply with the Lower Charles River Total Phosphorus Total Maximum Daily Load (TMDL). The Project will remove at least 80% of Total Phosphorus through structural infiltration systems, and will explore non-structural methods to further Total Phosphorous..

SS Credit 5 Heat Island Reduction

2 credit points

The roof and non-roof hardscape materials will include light-colored surfaces to reduce the overall heat island effect impact on the project site. The roof membrane will be a high albedo roof product with an initial SRI value of 82 minimum. The inclusion of a green roof will be further studied as the design progresses. Paving materials will target an initial SR value of 33 minimum. All parking associated with the project will be located undercover, off-site in the existing Green Garage.

SS Credit 6 Light Pollution Reduction

1 credit point

The project plans to meet uplight and light trespass requirements by complying with the LEED v4 BUG Rating method. The project site is classified under Lighting Zone 3 as per the Illuminating Engineering Society and International Darky Sky Association (IES/IDA) Model Lighting Ordinance User Guide. To meet credit requirements, the site lighting will not exceed the LEEDv4 allowable luminaire backlight, uplight and glare ratings for this lighting zone.

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SS Credit 7 Tenant Design and Construction Guidelines 1 credit point Tenant Design and Construction Guidelines will outline the sustainable design and energy efficiency measures in the project and provide detailed guidance for the tenants to design and build in alignment with the project sustainability goals. Information will be included to assist tenants in pursuing LEED certification for their spaces.

D. Water Efficiency (WE)

WE Prerequisite 1 Outdoor Water Use Reduction, 30% peak watering month.

WE Prerequisite 2 Indoor Water Use Reduction, 20% Reduction requirements. Preliminary water use calculations are provided below.

Flush Fixture Type	Baseline GPF	Design GPF	Uses/ Day	Baseline Annual Use (kGallons)	Design Annual Use (kGallons)	% Savings
Water Closet	1.6gpf	1.28gpf	3,000.7	1,248.29	998.63	
Urinal	1.0gpf	.125gpf	1,486.3	386.44	48.3	
Sub-TOTAL annual water savings				1,634.73	1,046.94	35.96%
Flow Fixture Type	Baseline GPM/GP C	Design GPM/GPC	Uses/ Day	Baseline Annual Use/kGallons	Design Annual Use/kGallons	% Savings
Public Lavatory	.5gpm	0.35gpm	4,487	291.66	204.16	
Shower for FTEs	2.5gpm	1.5gpm	145	471.25	282.75	
FTE Kitchen Sink	2.2gpm	1.5gpm	1,450	207.35	141.38	
Sub-TOTAL annual				970.26	628.28	35.25%
water savings						
TOTAL annual				2,604.98	1,675.22	35.69%
water savings						

WE Prerequisite 3 Building Level Water Metering The project will meet the requirements of this prerequisite by installing permanent water meters that measure the total potable water use for the building and associated grounds. In addition to installing the meters, the project will commit to sharing water usage data with the USGBC for a five-year period beginning on the date the project accepts LEED certification or typical occupancy, whichever comes first.

WE Credit 1 Outdoor Water Use Reduction 50% 1 credit point The landscape design will incorporate native and adaptive plantings and the design of the irrigation system will target at least a 50% reduction in potable water use when compared to a mid-summer baseline using high controller efficiency and moisture sensors.

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Required Through the use of native/adaptive plant species selection and optimized irrigation system efficiency, the project's landscape water requirement (as calculated by the EPA WaterSense Water Budget Tool) will be reduced by at least 30% from the calculated baseline for the site's

Required Through the specification of low flush and flow and high efficiency plumbing fixtures, the project will reduce potable water consumption by at least 20% over the baseline calculated for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance

Required

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WE Credit 2 Indoor Water Use Reduction

3 credit points

Through the specification of low flow and high efficiency plumbing fixtures, the project will implement water use reduction strategies that target 35% less potable water use annually when compared to EPA baseline fixtures for the building (not including irrigation) after meeting Energy Policy Act of 1992 fixture performance requirements. (Refer to the summary water use calculations provided under WE Prerequisite 1 above.)

WE Credit 3 Cooling Tower Water Use

1 credit point

The project will conduct a one-time potable water analysis for the cooling tower water and calculate the cycles of concentration. Through increasing the level of treatment in the make-up and/or condenser water, the project will achieve the calculated maximum number of cycles before any of the parameters analyzed exceed their maximum allowable levels of concentration. The control parameters that are required to be assessed are: Ca, total alkalinity, SiO₂, Ci, and conductivity.

WE Credit 4 Water Metering

1 credit point

The project is planning to install permanent water meters for at least two of the following water subsystems: irrigation, indoor plumbing fixtures and fittings, domestic hot water, boilers with a projected annual use of 100,000 gallons or more than 500,000 BtuH, reclaimed water, or other process water.

E. Energy and Atmosphere (EA)

Required

EA Prerequisite 1 Fundamental Commissioning and Verification A third-party Commissioning Agent, (CxA) will be engaged by the Building Owner for purposes of providing fundamental commissioning services for the building energy related systems including HVAC, lighting, domestic hot water systems and building envelope. The CxA will be required to perform the scope of work required to comply with the prerequisite in accordance with ASHRAE Guideline 0-2005 and ASHRAE Guideline 1.1-2007 for HVAC & R systems. Owner's Project Requirements (OPR) and Basis of Design (BOD) documents will be developed.

EA Prerequisite 2 Minimum Energy Performance

Required

To meet the prerequisite, the building performance will demonstrate a minimum of 5% improvement in energy use by cost when compared to a baseline building performance as calculated using the rating method in Appendix G of ANSI/ASHRAE/IESNA Standard 90.1-2010. The project is also required to meet the 9th Edition of the MA Energy Code and MA Stretch Energy Code requirements.

Preliminary energy analysis results demonstrate that the project is anticipated to reduce energy costs savings compared to the ASHRAE 90.1-2010 baseline by 17% to 22% depending on the energy conservation measures (ECMs) that are incorporated into the final project design. The savings stated above are the result of the following ECMs:

- Improved thermal performance for glazing assembly
- Increased roof insulation
- Increased wall insulation
- High-efficiency gas-fired, condensing boilers
- High-efficiency, water-cooled chillers
- Low-flow plumbing fixtures
- Variable speed, premium-efficiency pumping system
- The primary HVAC system consists of:
 - Active Chilled Beams with DOAS and energy recovery (80% EFF)

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Other energy conservation measures (ECMs) that are being considered and evaluated as the design progresses include but are not limited to the following:

- Improved interior lighting power density
- Energy-efficient exterior lighting
- Water re-use for cooling tower
- CO2 based demand control ventilation for offices •
- Optimized thermal comfort and lighting controls ٠
- Roof-mounted solar photovoltaic system

EA Prerequisite 3 Building Level Energy Metering Required To meet the requirements of this prerequisite, the project will install whole building energy meters for gas and electricity use by the core and shell project.

EA Prerequisite 4 Fundamental Refrigerant Management Required CFC based refrigerants will not be used in the building HVAC & R systems. Additionally, depending on use of leasable space, equipment such as walk in freezers and coolers installed by future tenants will be required to meet credit requirements.

EA Credit 1 Enhanced Commissioning

5 credit points, 1 maybe point In addition to EApr1 Fundamental Commissioning and Verification requirements, enhanced and envelope commissioning will be pursued. The building owner is planning to engage a Commissioning Agent during the design phase to review the proposed design and ultimately confirm the building systems are installed and function as intended and desired.

Enhanced commissioning scope will include reviewing the owner's project requirements, and the basis of design, creating, distributing and implementing a commissioning plan, performing a design review of the project documents, witnessing on-site installations and testing and performing commissioning of installed HVAC, lighting, lighting controls and domestic hot water systems. In addition to the mechanical and electrical systems, fundamental and enhanced commissioning requirements will apply to the buildings thermal envelope.

The Owner is considering pursuing monitoring-based commissioning for an additional point which entails measuring and evaluating the performance data of the building systems postoccupancy on a continuous basis with the goal of achieving consistent and optimal efficiency.

EA Credit 2 Optimize Energy Performance 8 credit points, 2 maybe points Based on current design, preliminary energy model results indicate the project is performing 14% - 17% better than the baseline (ASHRAE 90.1-2013) to meet the MA State Stretch Energy Code. This equates to a 17% - 22% energy cost savings, or 8 -10 points, under LEED v4 (ASHRAE 90.1-2010). Refer to EA Prerequisite 2 for more details.

EA Credit 3 Advanced Energy Metering

1 credit point Advanced energy meters are planned for the base-building design so that tenants will be capable of independently metering energy consumption for all systems dedicated to their space. A sufficient number of meters will be provided to allow the tenants to capture total energy use, with a minimum of one meter per energy source (electricity, chilled and/or condenser water for cooling, hot water for heating, etc.) per floor. Meters will be capable of recording data in intervals of one hour or less with a remotely accessible building automation system that can report hourly, daily, monthly, and annual energy use.

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EA Credit 6 Enhanced Refrigerant Management

1 maybe point

The HVAC equipment installed in the base building will use refrigerants that have low global warming and ozone depletion potential. Refrigerant calculations will be completed once MEP equipment has been selected. Credit compliance is also dependent on office and retail tenants agreeing to install compliant equipment as part of the fit-out scope of work.

EA Credit 7 Green Power and Carbon Offsets 2 credit points The Owner will purchase of carbon offsets through a 5-year contract to offset a minimum of 50% of the building's energy use with renewable sources.

F. Materials and Resources (MR)

MR Prerequisite 1 Storage and Collection of Recyclables Required Storage of collected recyclables will be accommodated on the ground floor of the project in a designated recycling area. Recyclable materials collected will include mixed paper, corrugated cardboard, glass, plastics, and metals, and the disposal of batteries and electronic waste. Tenants will bring their recyclables to the central storage room. A contracted waste management company will collect the recyclables on a regular basis.

MR Prerequisite 2 Construction and Demolition Waste Management Planning Required The project will meet the requirements of this prerequisite by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the construction manager to submit and implement a compliant waste management plan for the duration of construction. Waste diversion goals for the project will include at least five materials (both structural and nonstructural) targeted for diversion.

MR Credit 1 Building Life-Cycle Impact Reduction 3 credit points The project team is planning to conduct a whole-building life-cycle assessment that demonstrates that the project's structure and enclosure achieves at least a 10% reduction in a minimum of three of the six impact categories when compared to a baseline building. One of the impact categories must be global warming potential. The remaining impact categories that will be assessed are: depletion of the stratospheric ozone layer, acidification, eutrophication, formation of tropospheric ozone and depletion of nonrenewable energy resources.

MR Credit 2 Building Product Disclosure and Optimization (BPDO): EPDs 1 credit point The project will attempt this credit via Option 1. The technical specifications will include direction for the construction manager and their sub-contractors to provide and submit materials and products Environmental Product Declarations that conform to ISO 14025, 14040, 14044, and EN 15804 or ISO 21930 and have at least a cradle to gate scope. The project will work to provide documentation for 20 different permanently installed products sourced from at least five different manufacturers.

MR Credit 3 BPDO: Sourcing of Raw Materials

1 maybe point

The project will attempt this credit via Option 2. The technical specification will include information for applicable products and materials to meet one of the following extraction criteria (as applicable): Extended producer responsibility, Bio-Based materials, FSC wood, Materials reuse, Recycled Content, and/or regionally extracted and manufactured (within 100 miles of the project site).

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MR Credit 4 BPDO: Material Ingredients

The project will attempt this credit via Option 1. The project manual will include the information and direction for the construction manager and their sub-contractors to provide and submit materials and products documentation identifying the chemical make-up. The documentation may be Health Product Declarations, Cradle-to-Cradle or Declare certification. The project team will work to provide documentation for 20 different permanently installed products sourced from at least five different manufacturers.

MR Credit 5 Construction and Demolition Waste Management 2 credit points

The project will meet the requirements of this credit by including a Construction Waste Management section in Division 1 of the project manual. The specification will include direction for the construction manager to divert a minimum of 75% of the demolition and construction waste generated on site from area landfills. The construction waste management plan will include tracking 5 waste streams. Diverted material reported will include at least four different material streams. Demolition waste will be separated on site as part of the strategy to meet this credit.

G. Indoor Environmental Quality (IEQ)

IEQ Prerequisite 1 Minimum IAQ Performance Required The building mechanical systems will be designed to meet or exceed the requirements of ASHRAE Standard 62.1-2010 sections 4 through 7 and/or applicable building codes. The mechanical engineer will complete a ventilation rate procedure (VRP) calculator to verify compliance. Outdoor airflow monitors will be included in the project.

IEQ Prerequisite 2 Environmental Tobacco Smoke Control Required Smoking is prohibited in the building and within 25' of the building. Signage will be posted within 10' of all building entrances to indicate the interior and exterior no-smoking policy.

IEQ Credit 1 Enhanced Indoor Air Quality Strategies

IEQ Credit 2 Low Emitting Materials

1 credit point The project will attempt this credit through meeting the compliance criteria for the following compliant categories: interior paints and coatings, adhesives and sealants, flooring, and composite wood.

IEQ Credit 3 Construction Indoor Air Quality Management Plan 1 credit point The project manual will include direction for the construction manager to develop and implement an Indoor Air Quality Management plan in compliance with applicable control measures as stated in the SMACNA IAQ Guidelines for Occupied Buildings under construction 2nd Edition, 2007 ANSI/SMACNA 008-2008 Chapter 3. Additional measures will be implemented to ensure absorptive materials will be protected from moisture damage.

IEQ Credit 5 Quality Views

1 credit point A direct line of sight to the outdoors will be provided for 75% of the regularly occupied floor area. 75% of the regularly occupied floor area will also have quality views to the outdoors which may include multiple lines of sight; unobstructed views; views to landscaped areas, sky,

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1 maybe point

2 credit points The project is being designed to incorporate permanent entryway systems, properly enclosed and ventilated chemical use/storage areas and compliant filtration media. Additionally, CO2 monitoring will be performed by tenants in all densely occupied spaces. Credit compliance is dependent on tenants agreeing to meet credit requirement as part of the fit-out scope of work.

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pedestrian walkways, and streetscapes. The building will use a test fit tenant layout plan to demonstrate compliance.

H. Innovation (IN)

<u>INc1 Innovation: OM Starter Kit</u> 1 credit point The Owner will develop and implement a green cleaning plan that focuses on the use of green cleaning products and equipment in the common areas. Tenants will also be required to comply with the requirements outlined in the base-building Green Cleaning program.

The Owner will develop and implement an indoor integrated pest management (IPM) program. The plan will require routine inspection and monitoring, along with the incorporation of integrated methods, specification of emergency application measures for pesticides, and communication strategies to building occupants. All cleaning products included in the IPM plan will adhere to the requirements listed in the Green Cleaning plan for the project. Tenants will also be required to comply with the requirements outlined in the base-building IPM program.

<u>INc2 Innovation: Purchasing - Lamps</u> 1 credit point The project will achieve one innovation point for complying with LEED Innovation Credit: Purchasing – Lamps, which requires that the calculated average mercury content for the project is below 35 picograms of Hg per lumen hour.

<u>INc3 and INc4 Innovation: To be determined</u> 2 maybe points The team is exploring options to achieve the remaining 2 Innovation credits.

<u>INc5 Pilot: Integrative Analysis of Building Materials</u> 1 credit point The project will specify, purchase and install three different permanently installed products that have a documented qualitative analysis of potential health, safety, and environmental impacts of the product over its life cycle.

<u>INc6 LEED Accredited Professional</u> 1 credit point Many members of the team are LEED Accredited Professionals (AP's).

I. Regional Priority (RP)

Regional Priority Credits (RPCs) are established by the USGBC to have priority for a particular area of the country. When a project team achieves one of the designated RPCs, an additional credit is awarded to the project. LEEDv4 RPCs applicable to the Cambridge area include: LTc3 High Priority Site (2 points), SSc4 Rainwater Management (2 points), WEc2 Indoor Water Use Reduction (4 points), EAc2 Optimize Energy Performance (17%/8 points), EAc5 Renewable Energy Production (3%/2 points), and MRc1 Building Life-Cycle Impact Reduction (2 points). This project is currently tracking the following RPCs:

RPc1 EAc2 Optimize Energy Performance (17%/8 points)	1 credit point
RPc2 MRc1 Building Life-Cycle Impact Reduction (2 points)	1 credit point
RPc3 LTc3 High Priority Site (2 points)	1 credit point

END OF DOCUMENT

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DRAFT LEED SCORECARD



LEED v4 for Core and Shell Development Project Scorecard

Project Name: 3CC - 325 Main Street Address: 325 Main Street, Cambridge, MA 02142 Date of Issue: 6.29.18

D/C	Yes	Maybe	No			
	1	0	0		Integrative Process	1
D	1			Credit 1	Integrative Process	1
	Yes	Maybe	No			
	14	5	1		Location and Transportation	20
D			Ν	Credit 1	LEED for Neighborhood Development Location	20
D	2			Credit 2	Sensitive Land Protection	2
D	2		1	Credit 3	High Priority Site	3
D	6			Credit 4	Surrounding Density and Diverse Uses	6
D	3	3		Credit 5	Access to Quality Transit	6
D		1		Credit 6	Bicycle Facilities	1
D		1		Credit 7	Reduced Parking Footprint	1
D	1		-	Credit 8	Green Vehicles	1

	Yes	Maybe	No			
	5	3	3		Sustainable Sites	11
С	Υ			Prereq 1	Construction Activity Pollution Prevention	Required
D	1			Credit 1	Site Assessment	1
D			2	Credit 2	Site Development; Protect or Restore Habitat	2
D			1	Credit 3	Open Space	1
D		3		Credit 4	Rainwater Management	3
D	2			Credit 5	Heat Island Reduction	2
D	1			Credit 6	Light Pollution Reduction	1
D	1			Credit 7	Tenant Design and Construction Guidelines	1

	Yes	Maybe	No			
	6	0	5		Water Efficiency	11
D	Y			Prereq 1	Outdoor Water Use Reduction	Required
D	Y			Prereq 2	Indoor Water Use Reduction (TLSA)	Required
D	Y			Prereq 3	Building-level Water Metering	Required
D	1		1	Credit 1	Outdoor Water Use Reduction	2
D	3		3	Credit 2	Indoor Water Use Reduction (TLSA)	6
с	1		1	Credit 3	Cooling Tower Water Use	2
D	1			Credit 4	Water Metering	1

	Yes	Maybe	No			
	16	4	13		Energy and Atmosphere	33
	Υ			Prereq 1	Fundamental Commissioning and Verification	Required
	Υ			Prereq 2	Minimum Energy Performance (TLSA)	Required
	Υ			Prereq 3	Building-level Energy Metering	Required
	Υ			Prereq 4	Fundamental Refrigerant Management (TLSA)	Required
	5	1		Credit 1	Enhanced Commissioning	6
	8	2	8	Credit 2	Optimize Energy Performance (TLSA)	18
	1			Credit 3	Advanced Energy Metering	1
			2	Credit 4	Demand Response	2
			3	Credit 5	Renewable Energy Production	3
		1		Credit 6	Enhanced Refrigerant Management (TLSA)	1
: [2			Credit 7	Green Power and Carbon Offsets	2

Yes Maybe No 6 2 6 Materials and Resources 14

 6
 2
 6
 Materials and Resources

 P
 Prereq 1
 Storage & Collection of Recyclables

 C
 Y
 Prereq 2
 Construction and Demolition Waste Management Planning

 C
 3
 3
 Credit 1
 Building Life-cycle Impact Reduction

 C
 1
 1
 Credit 2
 Building Product Disclosure and Optimization-Environmental Product Declarations

 C
 1
 1
 Credit 3
 Building Product Disclosure and Optimization-Sourcing of Raw Materials

 C
 1
 1
 Credit 4
 Building Product Disclosure and Optimization-Material Ingredients

 C
 2
 Credit 5
 Construction and Demolition Waste Management

 Required Required 6 2 2 2 2

	Yes	Maybe	No			
	5	0	5		Indoor Environmental Quality	10
D	Y			Prereq 1	Minimum IAQ Performance (TLSA)	Required
D	Y			Prereq 2	Environmental Tobacco Smoke (ETS) Control (TLSA)	Required
D	2			Credit 1	Enhanced IAQ Strategies (TLSA)	2
D	1		2	Credit 2	Low-Emitting Materials	3
С	1			Credit 3	Construction IAQ Management Plan	1
D			3	Credit 7	Daylight	3
D	1			Credit 8	Quality Views	1
				-		
	Yes	Maybe	No			
	4	2	0		Innovation	6
D	1			Credit 1	Exemplary Performance: SSc5 Heat Island	1
D	1			Credit 2	Exemplary Performance: Reduced Parking Footprint (60%)	1
D		1		Credit 3	Innovation: O&M Starter Kit, Green Cleaning / Integrated Pest Mgmt (TLSA)	1
D/C		1		Credit 4	Innovation: Energy Savings During Construction or Low Mercury Lighting	1
D/C	1			Credit 5	Pilot Credit: TBD	1
с	1			Credit 6	LEED Accredited Professional	1
				-		
	Yes	Maybe	No			
	3	0	1		Regional Priority	4
				02142 - Ca	mbridge, MA: EAc5 (2 pts), EAc2 (8 pts), LTc3 (2 pts), MRc1 (2 pts), SSc4 (2 pts), WEc2 (4 pts)	
D	1			Credit 1	EAc2 Optimize Energy Performance (17%/8 pts)	1
С	1			Credit 2	MRc1 Building Life-Cycle Impact Reduction (2 pts)	1
D	1			Credit 3	LTc3 High Priority Site (2 points)	1
D			1	Credit 4	SSc4 Rainwater Management (2 pts)	1
				-		
	Yes	Maybe	No	_		
	60	16	34			110
				Certified:	40-49 points. Silver: 50-59 points. Gold: 60-79 points. Platinum: 80+ points	

SOLAR READY PLAN / GREEN ROOF 2.3

ROOF PLAN



SOLAR READY HIGH LEVEL DETAILS:

- Estimated project size: 40 kWDC (40 kWAC) of ballasted mounting (low profile, 5 degrees) ٠
- Estimated production: 48,000 kWh in year one on Roof A and Roof B .
- Minimum set back: 4 ft from roof edge .
- Structural: Require direct attachment into engineered dunnage or roof .
- Access to electrical room: requires 4 inch chase to electrical room for behind the meter in interconnection
- Wall space for inverter near project: Room for 2 x SolarEdge SE20k .

(http://www.solaredge.com/sites/default/files/se-three-phase-us-inverter-datasheet.pdf)

AXONOMETRIC

GREEN ROOFS & OCCUPIED ROOFS

- 1) Potential PV Roofs
- 3) Public / Retail Terrace
- 4) Potential Solar Roofs

NOTE:

The solar ready and green roof sections are offererd to demonstrate how 325 Main could offer a solar array or green roof in the future. This Design Review proposal does not contemplate an immediate plan to include solar or green roofs.



2) Potential Tenant Improvement Occupied or Green Roofs

3. ENVIRONMENTAL IMPACT

NARRATIVE

FINAL REPORT



KENDALL SQUARE MASTERPLAN

CAMBRIDGE, MA

PEDESTRIAN WIND STUDY RWDI # 1603158 August 7, 2018

SUBMITTED TO

SUBMITTED BY

Michael Tilford Senior Project Manager – Development

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PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN

RWDI #1603158 August 7, 2018

EXECUTIVE SUMMARY

East Parcel

The predicted wind conditions pertaining to the configurations assessed for the Commercial Building B wind tunnel test are graphically depicted on a site plan in Figures 3a through 4b located in the "Figures" section of this report. These conditions and the associated wind speeds are also numerically represented in Table 2, located in the "Tables" section of this report. The results presented can be summarized as follows:

- for both configurations;

BEST MANAGED COMPANIES

325 MAIN

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• Wind speeds at all locations are predicted to meet the criterion used to assess pedestrian wind safety

• Wind comfort conditions around the existing 325 Main Street building are expected to be comfortable for standing and sitting during the summer, with the exception of isolated locations comfortable for strolling and walking. During the winter, the wind conditions are generally expected to be comfortable for walking or better with the exception of isolated uncomfortable conditions along Main Street;

• The addition of the proposed Commercial Building B development, is expected to result in wind conditions similar to the existing site condition. These conditions are considered appropriate; and,

• The Commercial Building A and North and South Residential Buildings to the northwest of the 325 Main Street site are expected to have minimal influence on the wind conditions presented.

NARRATIVE

PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018



1 INTRODUCTION

RWDI was retained to conduct a Pedestrian Wind assessment for the proposed Commercial Building A (145 Broadway Street) and Residential Buildings North and South (135 Broadway Street) developments and the Commercial Building B (325 Main Street) development as part of the Kendall Square Masterplan in Cambridge, MA. This report presents the project objectives, background, approach, and provides a discussion of the results from RWDI's assessment.

1.1 Project Description

The project consists of the construction of;

- Two residential towers (north tower (170 ft tall) and south tower (350 ft tall)) on the existing garage at the 135 Broadway Street site;
- A 250 ft tall Commercial Office / Retail building at the 145 Broadway Street site; and,
- A 250 ft tall Commercial Office / Retail development at the 325 Main Street site.

1.2 Objectives

The purpose of the study was to assess the wind environment around the project in terms of pedestrian comfort and safety. This quantitative assessment was based on wind speed measurements on a 1:300 scale model of the project and its surroundings in a boundary-layer wind tunnel. The assessment focused on critical pedestrian areas including main and secondary entrances and sidewalks along adjacent and nearby streets.



Image 1: Site Plan – Aerial View of Site and Surroundings (Courtesy of Google™ Earth)

PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018

2 BACKGROUND AND APPROACH

Due to the size and distance between the Commercial Building A and Commercial Building B developments, two (2) wind tunnel study models were constructed and tested to provide an accurate representation of the wind conditions in the area and the impact of the developments.

The scale models of the proposed projects were constructed using the design information and drawings listed in *Appendix A*. The wind tunnel model included all relevant surrounding buildings and topography within an approximately 1200 ft radius of the study site. The boundary-layer wind conditions beyond the modelled area were also simulated in RWDI's wind tunnel. The placement of wind measurement locations was based on our experience and understanding of the pedestrian usage for this site, and reviewed by the project design team. These measurements were recorded for 36 equally incremented wind directions.

The wind tunnel study tests and models constructed are described and shown as follows;

2.2 Wind Tunnel Study Model - East Parcel

The wind environment around the proposed Commercial Building B development was assessed using a 1:300 scale wind tunnel model of the site and surroundings instrumented with 89 wind speed sensors to measure mean and gust wind speeds at a full-scale height of approximately 5 ft with the following configurations tested:

The existing 325 Main
at 145 Broadway Stre
(Image 2.2a); and,
The proposed Comme



n Street building including the existing surroundings (vacant site eet and existing parking structure at 135 Broadway Street),

ercial Building B development including the existing e Commercial Building A and Residential Building North and (Image 2.2b).

NARRATIVE

PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018



PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018





Image 2.2b: Wind Tunnel Study Model – Proposed Configuration



Image 2.2a: Wind Tunnel Study Model – Existing Configuration



NARRATIVE

PEDESTRIAN WIND STUDY **KENDALL SQUARE MASTERPLAN** RWDI #1603158 August 7, 2018



2.3 Meteorological Data

Wind statistics recorded at Boston Logan International Airport between 1988 and 2018, inclusive, were analyzed for the Summer (May through October) and Winter (November through April) seasons. Image 3 graphically depicts the directional distributions of wind frequencies and speeds for the two seasons. Winds from the southwest and west through northwest directions, are predominant in both the summer and winter seasons as indicated by the wind roses. Strong winds of a mean speed greater than 20 mph measured at the airport (at an anemometer height of 30 ft) occur for 4.8% and 12.6% of the time during the summer and winter seasons, respectively.

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



Wind Speed		Probability (%)				
(mph)		Summer	Winter			
	Calm	2.5	2.2			
	1-5	7.7	5.8			
	6-10	35.6	27.1			
	11-15	34.5	31.6			
	16-20	14.9	20.8			
	>20	4.8	12.6			

Image 3: Directional Distribution of Winds Approaching Boston Logan International Airport From 1988 to 2018

PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018

2.4 RWDI Pedestrian Wind Criteria

The RWDI pedestrian wind criteria, which has been developed by RWDI through research and consulting practice since 1974, are used in the current study. These criteria have been widely accepted by municipal authorities as well as by the building design and city planning community. They are sometimes subjective and regional differences in wind climate and thermal conditions as well as variations in age, health, clothing, etc. can affect a person's perception of the wind climate. Therefore, comparisons of wind speeds for the existing and proposed building configurations are the most objective way in assessing local pedestrian wind conditions. In general, the combined effect of mean and gust speeds on pedestrian comfort can be quantified by a Gust Equivalent Mean (GEM).

Comfort Category	GEM Speed (mph)	
Sitting	<u><</u> 6	Calm or lig where one
Standing	<u><</u> 8	Gentle bree places whe
Strolling	<u><</u> 10	Moderate v strolling alo
Walking	<u><</u> 12	Relatively h run or cycle
Uncomfortable	> 12	Strong win pedestrian

Notes:

- (1) GEM speed = max (mean speed, gust speed/1.85);
- outdoor spaces is anticipated; and,
- distinct differences in pedestrian outdoor behaviors between these two-time periods.

Safety Criterion	Gust Speed (mph)	
Exceeded	> 56	Excessive

Notes:

- pedestrians.



Description

ht breezes desired for outdoor restaurants and seating areas e can read a paper without having it blown away

ezes suitable for main building entrances, bus stops, and other ere pedestrians may linger

winds that would be appropriate for window shopping and ong a downtown street, plaza or park

high speeds that can be tolerated if one's objective is to walk, le without lingering

nds of this magnitude are considered a nuisance for all activities, and wind mitigation is typically recommended

(2) GEM speeds listed above are based on a seasonal exceedance of 20% of the time between 6:00 and 23:00. Nightly hours between 0:00 and 5:00 are excluded from the wind analysis for comfort since limited usage of

(3) Instead of standard four seasons, two periods of summer (May to October) and winter (November to April) are adopted in the wind analysis, because in a moderate climate such as that found in Cambridge, there are

Description

gust speeds that can adversely affect a pedestrian's balance and footing. Wind mitigation is typically required.

(1) Based on an annual exceedance of 9 hours or 0.1% of the time for 24 hours a day; and, (2) Only gust speeds need to be considered in the wind safety criterion. These are usually rare events, but deserve special attention in city planning and building design due to their potential safety impact on

NARRATIVE

PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018

3 RESULTS AND DISCUSSION

Wind conditions comfortable for walking or strolling are appropriate for sidewalks and walkways as pedestrians will be active and less likely to remain in one area for prolonged periods of time. Lower wind speeds conducive to standing or sitting are preferred at locations where pedestrians are apt to linger and passive activities are desired such as main entrances, bus stops parks, outdoor plazas etc.

The following is a detailed discussion of the suitability of the predicted wind comfort conditions for the anticipated pedestrian use of each area of interest.



PEDESTRIAN WIND STUDY KENDALL SQUARE MASTERPLAN RWDI #1603158 August 7, 2018

3.2 East Parcel

The predicted wind comfort conditions pertaining to the configurations assessed are graphically depicted on a site plan in **Figures 3a through 3b** located in the *"Figures"* section of this report. These conditions and the associated wind speeds are also numerically represented in **Table** 2, located in the *"Tables"* section of this report.

Wind conditions that meet the safety criterion are predicted for both configurations assessed.

3.2.1 Existing Configuration

For the existing configuration, the wind conditions surrounding the existing 325 Main Street site are generally expected to be comfortable for standing and sitting during the summer, with the exception of isolated locations to the east along Main Street comfortable for strolling (Locations 11 - 14, 16, 17, and 27 in **Figure 3a**) and one location comfortable for walking (Location 25 in **Figure 3a**). building

The wind conditions on the Kendall Square Rooftop Garden on the parking garage to the north of 325 Main Street building, are expected to be comfortable for standing and sitting during the summer (Locations 81 to 86, 88 and 89 in **Figure 3a**).

During the winter, the wind conditions are generally expected to be comfortable for walking or better with the exception of uncomfortable conditions expected along Main Street (Location 25 in **Figure 4a**).

Wind conditions on the Kendall Square Rooftop Garden on the parking garage to the north of 325 Main Street building are expected to be comfortable for strolling or better during the winter (Locations 81 through 89 in **Figure 4a**).

3.2.2 Proposed Configuration

The addition of the proposed Commercial Building B development, is expected to result in wind conditions similar to the existing site condition with conditions generally comfortable for standing and sitting and isolated strolling and walking conditions throughput the site for both the summer and winter (**Figures 3b and 4b**). These conditions are considered appropriate.

The wind speeds are however expected to increase slightly on the Kendall Square Rooftop Garden on the parking garage to the north of Commercial Building B.

The Commercial Building A and North and South Residential buildings to the northwest of the Commercial building B development are expected to have minimal influence on the wind conditions presented.

















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Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

			Wind C	omfort		Wind Safety	
	6		Summer		Winter		Annual
Location	Configuration	Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
1	Existing	7	Standing	8	Standing	32	Pass
	Proposed	5	Sitting	6	Sitting	21	Pass
2	Existing	6	Sitting	7	Standing	27	Pass
	Proposed	6	Sitting	6	Sitting	26	Pass
3	Existing	7	Standing	8	Standing	35	Pass
	Proposed	6	Sitting	6	Sitting	29	Pass
4	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	7	Standing	8	Standing	31	Pass
5	Existing	6	Sitting	6	Sitting	24	Pass
	Proposed	5	Sitting	6	Sitting	23	Pass
6	Existing	7	Standing	8	Standing	34	Pass
	Proposed	7	Standing	8	Standing	34	Pass
7	Existing	7	Standing	8	Standing	35	Pass
	Proposed	6	Sitting	7	Standing	30	Pass
8	Existing	8	Standing	9	Strolling	35	Pass
	Proposed	7	Standing	8	Standing	32	Pass
9	Existing	6	Sitting	6	Sitting	24	Pass
	Proposed	6	Sitting	7	Standing	29	Pass
10	Existing	7	Standing	8	Standing	32	Pass
	Proposed	7	Standing	8	Standing	35	Pass
11	Existing	9	Strolling	10	Strolling	42	Pass
	Proposed	10	Strolling	11	Walking	43	Pass
12	Existing	9	Strolling	10	Strolling	43	Pass
	Proposed	9	Strolling	10	Strolling	45	Pass
13	Existing	10	Strolling	12	Walking	47	Pass
	Proposed	10	Strolling	12	Walking	47	Pass
14	Existing	10	Strolling	12	Walking	44	Pass
	Proposed	10	Strolling	12	Walking	43	Pass
15	Existing	7	Standing	8	Standing	30	Pass
	Proposed	7	Standing	8	Standing	31	Pass
16	Existing	10	Strolling	12	Walking	47	Pass
	Proposed	11	Walking	12	Walking	48	Pass
17	Existing	10	Strolling	12	Walking	45	Pass
	Proposed	10	Strolling	12	Walking	45	Pass

Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

			Wind C	omfort		Wind Safety	
	Configuration		Summer		Winter		Annual
Location		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
18	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	7	Standing	8	Standing	34	Pass
19	Existing	7	Standing	8	Standing	35	Pass
	Proposed	7	Standing	8	Standing	35	Pass
20	Existing	8	Standing	10	Strolling	38	Pass
	Proposed	8	Standing	9	Strolling	37	Pass
21	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	36	Pass
22	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	8	Standing	36	Pass
23	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
24	Existing	8	Standing	9	Strolling	37	Pass
	Proposed	7	Standing	8	Standing	35	Pass
25	Existing	11	Walking	14	Uncomfortable	54	Pass
	Proposed	12	Walking	14	Uncomfortable	55	Pass
26	Existing	7	Standing	8	Standing	32	Pass
	Proposed	6	Sitting	6	Sitting	24	Pass
27	Existing	10	Strolling	12	Walking	46	Pass
	Proposed	8	Standing	10	Strolling	43	Pass
28	Existing	7	Standing	8	Standing	32	Pass
	Proposed	6	Sitting	7	Standing	30	Pass
29	Existing	7	Standing	8	Standing	31	Pass
	Proposed	7	Standing	7	Standing	29	Pass
30	Existing	6	Sitting	7	Standing	27	Pass
	Proposed	6	Sitting	7	Standing	30	Pass
31	Existing	7	Standing	7	Standing	29	Pass
	Proposed	7	Standing	8	Standing	32	Pass
32	Existing	7	Standing	9	Strolling	41	Pass
	Proposed	7	Standing	9	Strolling	42	Pass
33	Existing	7	Standing	8	Standing	33	Pass
	Proposed	8	Standing	9	Strolling	35	Pass
34	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	42	Pass

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Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

			Wind C	omfort		Wind Safety	
			Summer		Winter		Annual
Location	Configuration	Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
35	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
36	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
37	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
38	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
39	Existing	7	Standing	8	Standing	33	Pass
	Proposed	7	Standing	8	Standing	32	Pass
40	Existing	6	Sitting	7	Standing	27	Pass
	Proposed	6	Sitting	7	Standing	27	Pass
41	Existing	7	Standing	8	Standing	33	Pass
	Proposed	7	Standing	8	Standing	34	Pass
42	Existing	8	Standing	9	Strolling	35	Pass
	Proposed	8	Standing	10	Strolling	37	Pass
43	Existing	6	Sitting	7	Standing	28	Pass
	Proposed	7	Standing	7	Standing	29	Pass
44	Existing	6	Sitting	7	Standing	27	Pass
	Proposed	6	Sitting	6	Sitting	27	Pass
45	Existing	8	Standing	9	Strolling	35	Pass
	Proposed	8	Standing	9	Strolling	35	Pass
46	Existing	7	Standing	8	Standing	35	Pass
	Proposed	8	Standing	9	Strolling	37	Pass
47	Existing	5	Sitting	6	Sitting	24	Pass
	Proposed	5	Sitting	6	Sitting	22	Pass
48	Existing	7	Standing	7	Standing	32	Pass
	Proposed	7	Standing	8	Standing	33	Pass
49	Existing	7	Standing	8	Standing	34	Pass
	Proposed	7	Standing	8	Standing	34	Pass
50	Existing	8	Standing	10	Strolling	37	Pass
	Proposed	8	Standing	10	Strolling	37	Pass
51	Existing	7	Standing	7	Standing	33	Pass
	Proposed	6	Sitting	7	Standing	33	Pass

Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

			Wind C	omfort		W	/ind Safety
	Configuration		Summer	Winter		Annual	
Location		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating
52	Existing	8	Standing	10	Strolling	40	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
53	Existing	6	Sitting	7	Standing	29	Pass
	Proposed	6	Sitting	7	Standing	28	Pass
54	Existing	8	Standing	10	Strolling	39	Pass
	Proposed	8	Standing	10	Strolling	42	Pass
55	Existing	7	Standing	8	Standing	40	Pass
	Proposed	7	Standing	7	Standing	39	Pass
56	Existing	8	Standing	8	Standing	34	Pass
	Proposed	8	Standing	9	Strolling	35	Pass
57	Existing	8	Standing	10	Strolling	37	Pass
	Proposed	8	Standing	11	Walking	39	Pass
58	Existing	8	Standing	11	Walking	42	Pass
	Proposed	10	Strolling	12	Walking	45	Pass
59	Existing	7	Standing	8	Standing	32	Pass
	Proposed	7	Standing	8	Standing	34	Pass
60	Existing	9	Strolling	10	Strolling	42	Pass
	Proposed	9	Strolling	11	Walking	42	Pass
61	Existing	7	Standing	8	Standing	33	Pass
	Proposed	7	Standing	8	Standing	32	Pass
62	Existing	8	Standing	9	Strolling	38	Pass
	Proposed	8	Standing	10	Strolling	39	Pass
63	Existing	6	Sitting	7	Standing	31	Pass
	Proposed	6	Sitting	7	Standing	30	Pass
64	Existing	7	Standing	9	Strolling	34	Pass
	Proposed	8	Standing	10	Strolling	37	Pass
65	Existing	7	Standing	9	Strolling	37	Pass
	Proposed	8	Standing	10	Strolling	40	Pass
66	Existing	8	Standing	9	Strolling	37	Pass
	Proposed	8	Standing	10	Strolling	41	Pass
67	Existing	6	Sitting	7	Standing	30	Pass
	Proposed	7	Standing	8	Standing	35	Pass
68	Existing	7	Standing	9	Strolling	39	Pass
	Proposed	7	Standing	8	Standing	37	Pass

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PEDESTRIAN WIND ASSESSMENT 3.1 **TABLES**

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Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

			Wind C	omfort		Wind Safety		
	Configuration		Summer		Winter	Annual		
Location		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating	
69	Existing	7	Standing	8	Standing	32	Pass	
	Proposed	8	Standing	10	Strolling	39	Pass	
70	Existing	6	Sitting	7	Standing	32	Pass	
	Proposed	7	Standing	8	Standing	36	Pass	
71	Existing	5	Sitting	7	Standing	29	Pass	
	Proposed	6	Sitting	7	Standing	30	Pass	
72	Existing	5	Sitting	7	Standing	32	Pass	
	Proposed	5	Sitting	7	Standing	31	Pass	
73	Existing	8	Standing	12	Walking	43	Pass	
	Proposed	7	Standing	10	Strolling	45	Pass	
74	Existing	5	Sitting	6	Sitting	32	Pass	
	Proposed	5	Sitting	7	Standing	34	Pass	
75	Existing	6	Sitting	7	Standing	34	Pass	
	Proposed	6	Sitting	7	Standing	35	Pass	
76	Existing	6	Sitting	8	Standing	35	Pass	
	Proposed	6	Sitting	8	Standing	38	Pass	
77	Existing	6	Sitting	8	Standing	33	Pass	
	Proposed	7	Standing	8	Standing	34	Pass	
78	Existing	7	Standing	8	Standing	34	Pass	
	Proposed	7	Standing	8	Standing	35	Pass	
79	Existing	6	Sitting	7	Standing	32	Pass	
	Proposed	6	Sitting	7	Standing	33	Pass	
80	Existing	9	Strolling	11	Walking	45	Pass	
	Proposed	9	Strolling	12	Walking	43	Pass	
81	Existing	6	Sitting	6	Sitting	26	Pass	
	Proposed	7	Standing	8	Standing	34	Pass	
82	Existing	5	Sitting	6	Sitting	25	Pass	
	Proposed	6	Sitting	7	Standing	34	Pass	
83	Existing	7	Standing	8	Standing	35	Pass	
	Proposed	8	Standing	9	Strolling	37	Pass	
84	Existing	8	Standing	9	Strolling	35	Pass	
	Proposed	7	Standing	9	Strolling	34	Pass	
85	Existing	8	Standing	9	Strolling	40	Pass	
	Proposed	7	Standing	8	Standing	40	Pass	

Table 2: Pedestrian Wind Comfort and Safety Conditions (Commercial Building B)

	Configuration	Wind Comfort					Wind Safety	
Location			Summer		Winter		Annual	
Location		Speed (mph)	Rating	Speed (mph)	Rating	Speed (mph)	Rating	
86	Existing	6	Sitting	6	Sitting	25	Pass	
	Proposed	7	Standing	7	Standing	30	Pass	
87	Existing	10	Strolling	11	Walking	43	Pass	
	Proposed	7	Standing	9	Strolling	43	Pass	
88	Existing	5	Sitting	6	Sitting	22	Pass	
	Proposed	4	Sitting	5	Sitting	20	Pass	
89	Existing	8	Standing	8	Standing	40	Pass	
	Proposed	8	Standing	8	Standing	37	Pass	

Seasons	Months	Comfort Speed (mph)		Safety Speed (mph)
Summer	November - April	(20% Seasonal Exceedance)		(> 0.1% Annual Exceedance)
Winter	May - October	≤6	Sitting	≤ 56 Pass
Annual	January - December	7 - 8	Standing	> 56 Exceeded
Hours		9 - 10	Strolling	
Comfort	6:00 - 23:00	11 - 12	Walking	
Safety	0:00 - 23:00	> 12	Uncomfortable	
Configura	tions	-		
Existing				
Existing su	rrounds without the 135 Broadway Street and Commer	rcial Build	ing A developments	
Proposed				

Existing surrounds with North and South Residential Buildings, Commercial Building A and Building B developments

325 MAIN



3.2 **SHADOW STUDY**

325 MAIN

EQUINOX (MARCH 21 & SEPTEMBER 21)

March 21 and September 21 are the Spring and Fall Equinoxes, respectively on which Cambridge experiences roughly equal length day and night.







New Shadow Existing Shadow Proposed New Building

MARCH 21, 9:00 AM

MARCH 21, 12:00 PM

MARCH 21, 3:00 PM



3.2 **SHADOW STUDY**

325 MAIN

SUMMER SOLSTICE (JUNE 21)

June 21 is the summer solstice with the longest day of the year with the least amount of net new shadow.







New Shadow Existing Shadow Proposed New Building

JUNE 21, 9:00 AM

JUNE 21, 12:00 PM

JUNE 21, 3:00 PM

325 MAIN



3.2 **SHADOW STUDY**

325 MAIN

WINTER SOLSTICE (DECEMBER 21)

December 21 is the winter solstice and the shortest day of the year and, therefore, Cambridge experiences long shadows throughout the day in most locations.



New Shadow Existing Shadow Proposed New Building DECEMBER 21, 9:00 AM



DECEMBER 21, 12:00 PM



DECEMBER 21, 3:00 PM

4. LANDSCAPE

4.1 OPEN SPACE OVERVIEW

325 MAIN STREET (COMMERCIAL BUILDING B)

The streetscape along Main Street in front of the Project was very recently thoughtfully redesigned and renovated by the City of Cambridge and includes street trees, traditional and sculptural benches, bike parking hitches and other street furniture as documented in the following pages. Per discussions with the Cambridge Department of Public Works, before beginning construction, 325 Main will remove and protect the street furniture and remove and replant the existing eight (8) street trees at another appropriate jointly-agreed upon location. At the Project's completion, the street furniture and existing paving will be restored to its current condition and eight (8) replacement street trees will be planted in kind on Main Street.

KENDALL PLAZA

The existing Kendall Plaza was most recently renovated in 2012 and primarily serves as a major circulation element through and around Kendall Square, a connection point between MIT and the surrounding neighborhood and an access point to the MBTA Red Line Outbound Headhouse. The plaza is flanked by retail along its east side, retail and the Headhouse on its west side, the Marriott hotel lobby to the North, and Main Street to the South. In addition to serving as a public gathering space for Farmer's markets and other community events, Kendall Plaza features passive green space as well as moveable seating, promoting enjoyable public interaction and community engagement. With the redevelopment of 325 Main, the Project will significantly upgrade the public experience in Kendall Plaza through a revitalized two-story retail edge along its west side as well as aesthetic and minor functional upgrades to the existing MBTA Outbound Headhouse. Additionally, the Project will create a new pedestrian connection from Kendall Plaza to the Kendall Square Rooftop Garden, facilitating public access and enhancing visual and physical connections between these two important public spaces and the visual activation of Kendall Plaza (see below). These improvements will all serve to augment Kendall Plaza's role as a central hub of activity, neighborhood connector and transportation access point, further reinforcing Kendall Plaza as the center of Kendall Square.



325 MAIN





LEMON BROOKE

4.1 OPEN SPACE OVERVIEW

KENDALL SQUARE ROOFTOP GARDEN

The existing Kendall Square Rooftop Garden sits on the roof level of the Green Garage and is accessible to the public via elevators and stairwells on the Garage's north side along Broadway and the Garage's south side off Pioneer Way. With the redevelopment of 325 Main, the Project will deliver a new, highly visible and accessible pedestrian connection from Kendall Plaza up to the Kendall Square Rooftop Garden through a combination of publicly-accessible stairs, pathways and an elevator. This new feature will not only serve to connect two previously disconnected public spaces, but will also encourage increased public enjoyment of the Kendall Square Rooftop Garden. In addition, as shown in the following plans and sections, some planting materials will be replaced, an existing path will be reconstructed to provide accessible access to the new elevator and a new path will be built to provide access for the office tenant of the 325 Main building.



LEMON BROOKE

4.2.1 SITE PLAN AND CONTEXT LEVEL 01 & 02 PLAN



NOTE: DASHED RED LINE REPRESENTS THE LIMIT OF LANDSCAPE WORK FOR 325 MAIN

325 MAIN





4.2.1 SITE PLAN AND CONTEXT STREET SECTION



PICKARD CHILTON

LEMON BROOKE

4.2.1 SITE PLAN AND CONTEXT LEVEL 02 & KENDALL PLAZA



325 MAIN
DESIGN REVIEW SUBMISSION SEPTEMBER 06, 2018

SCALE: 1/8" = 1'-0"

LEMON BROOKE

4.2.1 SITE PLAN AND CONTEXT LEVEL 02 & PLAZA



325 MAIN

LEMON BROOKE

4.2.1 SITE PLAN AND CONTEXT

KENDALL SQUARE ROOF GARDEN PLAN



NOTE: DASHED RED LINE REPRESENTS THE LIMIT OF LANDSCAPE WORK FOR 325 MAIN

325 MAIN

PICKARD CHILTON

LEMON BROOKE

4.2.1 SITE PLAN AND CONTEXT KENDALL SQUARE ROOF GARDEN



4.2.2 FURNISHINGS









FURNISHINGS

Existing Wood Benches: 6 Total - Remove, protect, and reuse

Existing Black Metal Benches: 5 Total - Remove, protect, and reuse

Existing Concrete Benches: 8 Total - Remove, protect, and reuse

Sculptural Bike Hitch: 1 Total - Remove, protect, and reuse

Metal Bike Hitch: 22 Existing - Remove, protext, and reuse 25 New to match existing

4.2.2 FURNISHINGS



325 MAIN

1 Total - Remove, protect, and reuse

LEMON BROOKE

4.2.3 PAVING





325 MAIN DESIGN REVIEW SUBMISSION SEPTEMBER 06, 2018

LEMON BROOKE

4.2.3 PAVING







325 MAIN

LEMON BROOKE

4.2.4 LIGHTING



325 MAIN

3 Total - Remove, protect, and reuse

3 Total - Remove, protect, and reuse



LEMON BROOKE

4.3.1 PLANTING









325 MAIN

