

Volume 3 | APPENDICES

GREEN BUILDING CHECKLIST

Green Building Project Checklist

Green Building

Project Location:

49 6th Street (Sacred Heart Rectory, School, Convent), Cambridge MA, 02141

Applicant

Name:

Preservation of Affordable Housing (POAH)

Address:

Contact Information

2 Oliver Street Suite 500, Boston MA, 02109

Email Address:

Telephone #:

Jspringfield@poah.org

617-391-9431

Project Information (select all that apply):

☐ New Construction – GFA:

☐ Addition – GFA of Addition:

☒ Rehabilitation of Existing Building – GFA of Rehabilitated Area: 59,400sf

☐ Existing Use(s) of Rehabilitated Area: Vacant; school, rectory, convent

☐ Proposed Use(s) of Rehabilitated Area: Affordable housing

☐ Requires Planning Board Special Permit approval

☐ Subject to Section 19.50 Building and Site Plan Requirements

☐ Site was previously subject to Green Building Requirements

Green Building Rating Program/System:

☐ Leadership in Energy and Environmental Design (LEED) – Version:

☐ Building Design + Construction (BD+C) – Subcategory:

☐ Residential BD+C – Subcategory:

☐ Interior Design + Construction (ID+C) – Subcategory:

☐ Other:

☐ Passive House – Version:

☐ PHIUS+

☐ Passivhaus Institut (PHI)

☐ Other:

☒ Enterprise Green Communities – Version: 2020

Project Phase

☒ SPECIAL PERMIT

Before applying for a building permit, submit this documentation to CDD for review and approval.

Required Submissions

- All rating programs:
- ☒ Rating system checklist
 - ☒ Rating system narrative
 - ☒ Net zero narrative (see example template for guidance)
 - ☒ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Special Permit)

Project Phase

☐ BUILDING PERMIT

Before applying for a building permit, submit this documentation to CDD for review and approval.

Required Submissions

All rating programs:

- ☐ Rating system checklist – updated from any prior version
- ☐ Rating system narrative – updated from any prior version with additional supporting information from construction documents
- ☐ Net zero narrative – updated from any prior version (see example template for guidance)
- ☐ Energy Simulation Tool results demonstrating compliance with selected rating system. *[Note: For Passive House rating program, must use WUFI Passive, Passive House Planning Package (PHPP), or comparable software tool authorized by Passive House.]*
- ☐ Credentials of Green Commissioning Authority (or copy of contract between developer and Commissioning Authority if an independent consultant or subcontractor), including documentation of Green Commissioning process experience on at least two building projects with a scope of work similar to the proposed project extending from early design phase through at least ten (10) months of occupancy
- ☐ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Building Permit)

Passive House rating program only:

- ☐ Letter of intent from Passive House rater/verifier hired for on-site verification, with credentials of rater/verifier
- ☐ Credentials of Certified Passive House Consultant who has provided design, planning, or consulting services (if different from the Green Building Professional for the project)
- ☐ Construction drawings and specifications

Project Phase

☐ CERTIFICATE OF OCCUPANCY

Before applying for a certificate of occupancy, submit this documentation to CDD for review and approval.

Required Submissions

All rating programs:

- ☐ Rating system checklist – updated from any prior version
- ☐ Rating system narrative – updated from any prior version with additional supporting information from as-built conditions
- ☐ Net zero narrative – updated from any prior version (see example template for guidance)
- ☐ Energy Simulation Tool results demonstrating compliance with selected rating system, updated to as-built conditions. *[Note: For Passive House rating program, must use WUFI Passive, Passive House Planning Package (PHPP), or comparable software tool authorized by Passive House.]*
- ☐ Affidavit with schedule of commissioning requirements signed by Green Commissioning Authority, with attached credentials – use City form provided (Certificate of Occupancy)
- ☐ Affidavit signed by Green Building Professional with attached credentials – use City form provided (Certificate of Occupancy)

Passive House rating program only:

- ☐ Pressure Test Verification
- ☐ Ventilation Commissioning
- ☐ Quality Assurance Workbook
- ☐ Final testing and verification report from rater/verifier



ENTERPRISE GREEN COMMUNITIES CHECKLIST



2020 ENTERPRISE GREEN COMMUNITIES CRITERIA CHECKLIST

CRITERIA CHECKLIST

This checklist provides an overview of the technical requirements within the Enterprise Green Communities Criteria. To achieve Enterprise Green Communities Certification, all projects must achieve compliance with the Criteria mandatory measures applicable to that construction type. **New Construction projects must also achieve at least 40 optional points, and Substantial and Moderate Rehab projects must also achieve at least 35 optional points.**

These projects that also comply with Criterion 5.2b or Criterion 5.4 will be recognized with Enterprise Green Communities Certification Plus.

YES / NO	OPTIONAL POINTS	1. INTEGRATIVE DESIGN
Yes	M	1.1 Integrative Design: Project Priorities Survey Complete the Project Priorities Survey, which can be found in the Appendix.
Yes	M	1.2 Integrative Design: Charrettes and Coordination Meetings Develop an integrative design process that moves the outputs of the Project Priorities Survey into action through a series of collaborative meetings. Prioritize multi-benefit strategies. Assign responsibility within your design and development teams for accountability.
Yes	M	1.3 Integrative Design: Documentation Include Enterprise Green Communities Criteria information in your contract documents and construction specifications (Division 1 Section 01 81 13 Sustainable Design Requirements) as necessary for the construction team to understand the requirements and how they will be verified. Ensure, and indicate, that the drawings and specifications have been generated to be compliant and meet the certification goals.
Yes	M	1.4 Integrative Design: Construction Management Create, implement, and document your contractor/subcontractor education plan to ensure that all persons working on-site fully understand their role in achieving the project objectives. Include a summary of the Project Priorities Survey (Criterion 1.1), the sustainability goals, and anticipated roles of each party in regards to the performance expected of the project. Attach and reference this training plan to Division 1 Section 01 81 13 Sustainable Design Requirements. Include timeline estimates for performance testing and verification schedules in the overall construction schedule. As relevant, review requirements for Criteria 8.1, 8.2, and 8.3, and begin populating these documents with relevant information from design and construction.
0	12 or 15	1.5 Design for Health and Well-Being: Health Action Plan Follow Steps 1-6 of the Health Action Plan framework per the full criterion. <i>[12 points with extra 3 points for Step 7]</i> This includes: 1) Commit to embedding health into the project lifecycle; 2) Partner with a project health professional; 3) Collect and analyze community health data; 4) Engage with community stakeholders to prioritize health data and strategies; 5) Identify strategies to address those health issues; 6) Create an implementation plan; and 7) Create a monitoring plan.
0	10	1.6 Resilient Communities: Multi-Hazard Risk/Vulnerability Assessment Conduct a four-part assessment (social, physical, functional, strategy) to identify critical risk factors of your property and implement at least two sets of strategies to enable the project to adapt to, and mitigate, climate related or seismic risks. See full criterion for more guidance.
0	8	1.7 Resilient Communities: Strengthening Cultural Resilience Integrate community and resident participation in the development processes so that the built environment honors cultural identities, resident voices, and community histories. <i>Option 1:</i> Complete a Cultural Resilience Assessment OR <i>Option 2:</i> Convene a Cultural Advisory Group
CRITERIA 1 SUBTOTAL 4 of 4 Mandatory Criteria 0 Optional Points		
YES / NO	OPTIONAL POINTS	2. LOCATION + NEIGHBORHOOD FABRIC
Yes	M	2.1 Sensitive Site Protection All projects must: 1. Protect floodplain functions (e.g., storage, habitat, water quality) by limiting new development within the 100-year floodplain of all types of watercourses. 2. Conserve and protect aquatic ecosystems, including wetlands and deepwater habitats, that provide critical ecosystem functions for fish, other wildlife, and people. 3. Protect ecosystem function by avoiding the development of areas that contain habitat for plant and animal species identified as threatened or endangered. 4. Conserve the most productive agricultural soils by protecting prime farmland, unique farmland, and farmland of statewide or local importance. If your site contains any of these ecologically sensitive features, follow the specific Requirements under that subheading.
Yes	M	2.2 Connections to Existing Development and Infrastructure <i>(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town)</i> Locate the project on a site with access to existing roads, water, sewers, and other infrastructure and within or contiguous to (having at least 25% of the perimeter bordering) existing development. Connect the project to the existing pedestrian network. For sites over 5 acres, provide connections to the adjacent street network at least every 800 feet. Tie all planned bike paths to existing bike paths.

Yes	M
7	5 or 7
Yes	M
No	M
4	6 max
Yes	8
2	2-8
0	5 max
6	6
0	6
0	8
0	6 max

2.3 Compact Development

(Mandatory for New Construction)

At a minimum, build to the residential density (dwelling units/acre) of the census block group where the project is located. In Rural/Tribal/Small Town locations that do not have zoning requirements: Build to a minimum net density of 5 units per acre for single-family houses; 10 units per acre for multifamily buildings, single and two-story; and 15 units per acre for multifamily buildings greater than two-stories.

2.4 Increased Compact Development

Exceed the residential density (dwelling units/acre) of the census block group in which your project is located. Exceed by 2x for *[5 points]* ; exceed by 3x for *[7 points]* . In Rural/Tribal/Small Towns that do not have zoning requirements, build to a minimum net density of 7.5 units per acre for single-family houses; 12 units per acre for multifamily buildings, single and two-story; and 20 units per acre for multifamily buildings greater than two stories. *[5 points]*

2.5 Proximity to Services and Community Resources

(Mandatory for New Construction) Locate the project within a 0.5-mile walk distance of at least four, or a 1-mile walk distance of at least seven, of the listed services. For projects that qualify as Rural/Tribal/Small Town, locate the project within 5 miles of at least four of the listed services.

2.6 Preservation of and Access to Open Space for Rural/Tribal/Small Town

(Mandatory for New Construction Rural/Tribal/Small Town)

Option 1: Locate the project within a 0.25-mile walk distance of dedicated public open space that is a minimum of 0.75 acres; at least 80% of which unpaved.

OR

Option 2: Set aside a minimum of 10% (minimum of 0.25 acres) of the total project acreage as open and accessible to all residents; at least 80% of which unpaved.

2.7 Preservation of and Access to Open Space

Option 1: Locate the project within a 0.25-mile walk distance of dedicated open space that is a minimum of 0.75 acres; at least 80% of which unpaved.

OR

Option 2: Set aside a percentage of permanent open space for use by all residents; at least 80% of which unpaved. 20% *[2 points]* ; 35% *[4 points]* ; 45% + written statement of preservation/ conservation policy *[6 points]*.

2.8 Access to Transit

(Mandatory for New Construction projects that do not qualify as Rural/Tribal/Small Town; Optional for all other project types)

Mandatory: New Construction, not Rural/Tribal/Small Town

Locate projects within a 0.5-mile walk distance of transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service.

Optional: New Construction, not Rural/Tribal/Small Town

Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. *[2 points]*

Optional: Rehabilitation, not Rural/Tribal/Small Town

Locate projects within a 0.5-mile walk distance of public transit services (bus, rail and/or ferry), constituting at least 45 or more transit rides per weekday, with some type of weekend service. *[6 points]* Locate the project along dedicated bike trails or lanes (Class I, II, or IV) that lead to high-quality transit services (100 trips per day) within 3 miles. *[2 points]*

Optional: New Construction and Rehabilitation, Rural/Tribal/Small Town

Locate the project within 0.5 mile walk distance of public transit services with at least 45 rides per weekday and some weekend service. OR, Install at least two charging stations for electric vehicles. OR, Locate the project with 5 miles of one of the following transit options: 1) vehicle share program; 2) dial-a-ride program; 3) employer vanpool; 4) park-and-ride; 5) public/private regional transportation.

2.9 Improving Connectivity to the Community

Improve access to community amenities through at least one of the options incentivizing biking mobility or improving access to transit.

2.10 Passive Solar Heating/Cooling

Design and build with passive solar design, orientation, and shading that meet the guidelines specified.

2.11 Adaptive Reuse of Buildings

Rehabilitate and adapt an existing structure that was not previously used as housing. Design the project to adapt, renovate, or reuse at least 50% of the existing structure and envelope.

2.12 Access to Fresh, Local Foods

Provide residents and staff with access to fresh, local foods through one of the following options:

Option 1: Neighborhood Farms and Gardens

Option 2: Community-Supported Agriculture

Option 3: Proximity to Farmers Market

2.13 Advanced Certification: Site Planning, Design and Management

Locate building(s) within a community that is certified in LEED for Neighborhood Development, LEED for Cities and Communities, Living Community Challenge, or SITES.

2.14 Local Economic Development and Community Wealth Creation

No	0	2	Demonstrate that local preference for construction employment and subcontractor hiring was part of your bidding process, and how it functioned during construction.
		3	OR
		3	Demonstrate that you achieved at least 20% local employment.
		M	OR
			Provide physical space for small business, nonprofits, and/or skills and workforce education.
			2.15a Access to Broadband: Broadband Ready
			<i>(Mandatory for New Construction and Substantial Rehab Projects in Rural/Tribal/Small Town Locations)</i>
			Incorporate broadband infrastructure so that when broadband service comes to a community, the property can be easily connected. Include a network of mini-ducts or conduit throughout the building, extending from the expected communications access point to each network termination point in the building.
		6	2.15b Access to Broadband: Connectivity
			Ensure all units and common spaces in the property have broadband internet access with at least a speed of 25/3 mbs.
CRITERIA 2 SUBTOTAL			
5 of 7 Mandatory Criteria			
27 Optional Points			
3. SITE IMPROVEMENT			
Yes		M	3.1 Environmental Remediation
			Determine whether there are any hazardous materials present on the site through one of the four methods listed. Mitigate any contaminants found.
Yes		M	3.2 Minimization of Disturbance during Staging and Construction
			For sites >1 acre, implement EPA's National Pollutant Discharge Elimination System Stormwater Discharges from Construction Activities guidance, or local requirements, whichever is more stringent. For sites with an area <= 1, follow guidance in full criterion.
Yes		M	3.3 Ecosystem Services/Landscape
			<i>(Mandatory, if providing landscaping)</i>
			If providing plantings, all must be native or climate-appropriate (adapted) to the region and appropriate to the site,Âs soil and microclimate. Do not introduce any invasive plant species. Plant, seed, or xeriscape all disturbed areas.
Yes		M	3.4 Surface Stormwater Management
			<i>(Mandatory for New Construction; Mandatory for Substantial and Moderate Rehab projects if land disturbed is >= 5,000 sq.ft.)</i>
	0	10 max	Treat or retain on-site precipitation equivalent to the 60th percentile precipitation event. Where not feasible due to geotechnical issues, soil conditions, or the size of the site, treat or retain the maximum volume possible.
			3.5 Surface Stormwater Management
			Through on-site infiltration, evapotranspiration, and rainwater harvesting, retain precipitation volume from 70% precipitation event <i>[6 points]</i> , 80% precipitation event <i>[8 points]</i> , or 90% precipitation event <i>[10 points]</i> .
Yes		M	3.6 Efficient Irrigation and Water Reuse
			<i>(Mandatory, if permanent irrigation is utilized)</i>
	4	4 or 6	If irrigation is utilized, install an efficient irrigation system per the requirements listed.
			3.7 Efficient Irrigation and Water Reuse
			<i>(Optional, if irrigation is utilized)</i>
			Meet the requirements of Criterion 3.6
			AND:
			Option 1: Install an efficient irrigation system equipped with a WaterSense labeled weather- based irrigation controller (WBIC)
			OR
			Option 2: At least 50% of the site's irrigation satisfied by water use from the sources listed.
CRITERIA 3 SUBTOTAL			
5 of 5 Mandatory Criteria			
4 Optional Points			
4. WATER			
Yes		M	4.1 Water-Conserving Fixtures
			Reduce total indoor water consumption by at least 20% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified. For all single-family homes and all dwelling units in buildings three stories or fewer, the supply pressure may not exceed 60 psi.
	3	6 max	4.2 Advanced Water Conservation
			Reduce total indoor water consumption by at least 30% compared to baseline indoor water consumption chart. Any new toilet, showerhead, and/or lavatory faucet must be WaterSense certified.

Yes	0	M, 3	4.3 Water Quality
		M	Mandatory/Optional: Mandatory for Substantial Rehabs of buildings built before 1986; Optional for all other building types: Replace lead service lines <i>[3 points]</i>
		8	Mandatory: For multifamily buildings with either a cooling tower, a centralized hot water system, or 10+ stories: Develop a Legionella water management program
	0	4	Optional: Test and remediate as indicated for lead, nitrates, arsenic, and coliform bacteria
			4.4 Monitoring Water Consumption and Leaks
			Conduct pressure-loss tests and visual inspections to determine if there are leaks; fix leaks.
			AND
			Install an advanced water monitoring and leak detection system capable of identifying and shutting water off during anomalous water events.
			OR
			Install a device to separately monitor water consumption of each cold branch off the apartment line riser for each dwelling unit or each cold water riser and the domestic hot water cold water feed for each building or each toilet that allows remote monitor readings; common laundry facilities; boiler makeup water; outdoor water consumption; and water consumption in any non- residential space.
	0	4	4.5 Efficient Plumbing Layout and Design
			Store no more than 0.5 gallon of water in any piping/manifold between the fixture and the water heating source or recirculation line. No more than 0.6 gallon of water shall be collected from the fixture before a 10-degree Fahrenheit rise in temperature is observed. Recirculation systems must be demand-initiated.
	0	6 max	4.6 Non-Potable Water Reuse
			Harvest, treat, and reuse rainwater and/or greywater to meet a portion of the project,Âs non-potable water needs: 10% reuse <i>[3 points]</i> ; 20% reuse <i>[4 points]</i> ; 30% reuse <i>[5 points]</i> ; 40% reuse <i>[6 points]</i> .
	0	8	4.7 Access to Potable Water During Emergencies
			Provide residents with ready access to potable water in the event of an emergency that disrupts normal access to potable water, including disruptions related to power outages that prevent pumping water to upper floors of multifamily buildings or pumping of water from on-site wells, per one of the three options listed.
CRITERIA 4 SUBTOTAL			
2 of 2 Mandatory Criteria			
3 Optional Points			
5. OPERATING ENERGY			
No		M	5.1a Building Performance Standard
			<i>(Mandatory for New Construction)</i>
			Certify all buildings with residential units in the project through either ENERGY STAR Multifamily New Construction, ENERGY STAR Manufactured Homes, and/or ENERGY STAR Certified Homes as relevant.
			AND
			Provide projected operating energy use intensity and projected operating building emissions intensity.
Yes		M	5.1b Building Performance Standard
			<i>(Mandatory for Rehab)</i>
			Provide projected operating energy use intensity and projected operating building emissions intensity.
			AND
			Conduct commissioning for compartmentalization, insulation installation, and HVAC systems as indicated.
			AND one of the following options:
			- ERI Option: <= HERS 80 for each dwelling unit. Exception for some Rehabs built before 1980.
			- ASHRAE Option: Energy performance of the completed building equivalent to, or better than, ASHRAE 90.1-2013 using an energy model created by a qualified energy services provider according to Appendix G 90.1-2016.
	0	12 max	5.2a Moving to Zero Energy: Additional Reductions in Energy Use
			<i>(Not available for projects using prescriptive path for Criterion 5.1a or for projects following Criterion 5.2b or 5.4.)</i>
			Projects in C2 1-4A following this criterion must also comply with Criterion 7.8.
			Design and construct a building that is projected to be more efficient than what is required by Criteria 5.1a/b. Achieve HERS score of 5 lower than required by 5.1a/b if following ERI path for compliance OR 5% greater efficiency than required if following ASHRAE path for 5.1a/b compliance <i>[5 points]</i> .
			Additional 1 point for each additional 2-point decrease in HERS score required by Criteria 5.1a/b if following ERI path for compliance OR for 1% greater efficiency if following ASHRAE path for Criteria 5.1a/b, up to a maximum of 12 optional points.
	0	12-15	5.2b Moving to Zero Energy: Near Zero Certification
			[Automatic Qualification for Enterprise Green Communities Certification Plus]
			<i>(Not available for projects following Criterion 5.2a or 5.4.)</i>
			Projects in C2 1-4A following this criterion must also comply with Criterion 7.8. Certify the project in a program that requires advanced levels of building envelope performance such as DOE ZERH <i>[12 points]</i> and/or PHI Classic or PHIUS+ <i>[15 points]</i> .
	0	3-6	5.3a Moving to Zero Energy: Photovoltaic/Solar Hot Water Ready
			<i>(Not available for projects following Criterion 5.3b or 5.4.)</i>
			Orient, design, engineer, wire, and/or plumb the development through the Photovoltaic Ready pathway or Solar Hot Water Ready Pathway to accommodate installation of photovoltaic (PV) or solar hot water system in the future.

	0	8 max	5.3b Moving to Zero Energy: Renewable Energy <i>(Not available for projects following Criterion 5.3a or 5.4)</i> Install renewable energy source to provide a specified percentage of the project's estimated source energy demand. See full criterion for allowable sources. Option 1: For percentage of total project energy consumption provided by renewable energy. OR Option 2: For percentage of common area meter energy consumption provided by renewable energy.
	0	4-8 1-5 24	5.4 Achieving Zero Energy [Automatic Qualification for Enterprise Green Communities Certification Plus] <i>(Not available for projects following Criterion 5.2a, 5.2b, 5.3a, or 5.3b.)</i> Projects in CZ 1-4A following this criterion must also comply with Criterion 7.8. Achieve Zero Energy performance through one of the following options: Option 1: Certify each building in the project to DOE Zero Energy Ready Home program or PHI Plus AND Either install renewables and/or procure renewable energy, which in sum will produce as much, or more, energy in a given year than the project is modeled to consume. OR Option 2: Certify each building in the project in a program that requires zero energy performance such as PHIUS+ Source Zero, PHI Plus, PHI Premium, ILFI's Zero Energy Petal, Zero Carbon Petal, or Living Building Certification.
	0	5 max	5.5a Moving to Zero Carbon: All-Electric Ready <i>(Not available for projects following Criterion 5.5b)</i> Ensure the project has adequate electric service and has been designed and wired to allow for a seamless switch to electricity as a fuel source in the future for the following uses: space heating <i>[1 point]</i> , space cooling <i>[1 point]</i> , water heating (DHW) <i>[1 point]</i> , clothes dryers <i>[1 point]</i> , equipment for cooking <i>[1 point]</i> .
	15	15	5.5b Moving to Zero Carbon: All Electric <i>(Not available for projects following Criterion 5.5a)</i> No combustion equipment used as part of the building project; the project is all-electric.
Yes		M	5.6 Sizing of Heating and Cooling Equipment <i>(Mandatory for Substantial and Moderate Rehabs that include replacement of heating and cooling equipment. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Size and select heating and cooling equipment in accordance with ACCA manuals J and S OR in accordance with the ASHRAE Handbook of Fundamentals
Yes		M	5.7 ENERGY STAR Appliances <i>(Mandatory for Substantial and Moderate Rehabs providing appliances. Not relevant for projects following 5.1a, 5.2b, or 5.4.)</i> Install ENERGY STAR clothes washers, dishwashers, and refrigerators. If appliances will not be installed or replaced at this time, specify that at the time of installation or replacement, ENERGY STAR models must be used via Criterion 8.1 and Criterion 8.4.
Yes		M	5.8 Lighting <i>(Mandatory for all lighting within New Construction and Substantial Rehab projects. Mandatory for new lighting in Moderate Rehab projects.)</i> Follow the guidance for high-efficacy permanently installed lighting and other characteristics for recessed light fixtures, lighting controls, lighting power density, and exterior lighting.
	0	8	5.9 Resilient Energy Systems: Floodproofing <i>(Not relevant for Rehab projects in Special Flood Hazard Areas)</i> Conduct floodproofing of lower floors, including perimeter floodproofing (barriers/shields). Design and install building systems as specified by the full criterion so that the operation of those systems will not be grossly affected in case of a flood.
	0	8	5.10 Resilient Energy Systems: Critical Loads Loads Provide emergency power to serve at least three critical energy loads as described by the full criterion. Option 1: Islandable PV system OR Option 2: Efficient generator
CRITERIA 5 SUBTOTAL 4 of 5 Mandatory Criteria 15 Optional Points			
YES / NO	OPTIONAL POINTS	6. MATERIALS	
	0	8 max	6.1 Ingredient Transparency for Material Health Install products that have publicly disclosed inventories characterized and screened to 1,000 ppm or better: • 1 point per 5 installed Declare or HPD products from at least three different product categories • 1 point per 2 installed Declare or HPD products in any of these categories: adhesives, sealants, windows • 1 point per each product with third-party verified HPD or third-party verified Declare label • 2 points per each product with third-party verified HPD or third-party verified Declare label in any of these categories: adhesives, sealants, windows
	0	3 max	6.2 Recycled Content and Ingredient Transparency

	0	8 max	Use building products that feature, and disclose, their recycled content. The building product must make up 75% by weight or cost of a project category for the project and be composed of at least 25% post-consumer recycled content.
	0	8 max	6.3 Chemical Hazard Optimization
Yes	0	M	Install products that have third-party verification of optimization to 100 ppm or better per the options listed within the full criterion.
	0	15 max	6.4 Healthier Material Selection Select all interior paints, coatings, primers, and wallpaper; interior adhesives and sealants; flooring; insulation; and composite wood as specified. Optional points also available.
Yes	0	12 max	6.5 Environmentally Responsible Material Selection Select concrete, steel, or insulation with a publicly disclosed EPD <i>[3 points]</i> , install a green or cool roof <i>[3 points]</i> , use reflective paving <i>[3 points]</i> , and/or use FSC certified wood <i>[3 points]</i> . Refer to criterion for specifics.
	0	M	6.6 Bath, Kitchen, Laundry Surfaces <i>(Mandatory for New Construction and Substantial Rehab. Moderate Rehabs that do not include work in the shower and tub areas are exempt from the shower and tub enclosure requirement.)</i> Use materials that have durable, cleanable surfaces throughout bathrooms, kitchens, and laundry rooms. Use moisture-resistant backing materials per ASTM # D 6329 or 3273 behind tub/shower enclosures, apart from one-piece fiberglass enclosures which are exempt.
	0	4 max	6.7 Regional Materials Use products that were extracted, processed, and manufactured within 500 miles of the project for a minimum of 90%, based on weight or on cost, of the amount of the product category installed. Select any or all of these options (every two compliant materials can qualify for 1 point): • Framing Cladding (e.g. siding, masonry, roofing) • Flooring Concrete/cement and aggregate • Drywall/interior sheathing
Maybe		M	6.8 Managing Moisture: Foundations <i>(Mandatory for all New Construction projects and all Rehab projects with either basement and/or crawl space foundations)</i> Install capillary breaks and vapor retarders that meet specified criteria appropriate for the foundation type.
Maybe		M	6.9 Managing Moisture: Roofing and Wall Systems <i>(Mandatory for all Rehab projects that include deficiencies in or include replacing particular assemblies called out below. New Construction projects are considered compliant per Criterion 5.1.)</i> Provide water drainage away from walls, window, and roofs by implementing the list of techniques.
Yes	0	M	6.10 Construction Waste Management (6 max) Develop and implement a waste management plan that reduces non-hazardous construction and demolition waste through recycling, salvaging, or diversion strategies through one of the three options. Achieve optional points by going above and beyond the requirement.
	2	6 max 2	6.11 Recycling Storage For projects with municipal recycling infrastructure and/or haulers, provide separate bins for the collection of trash and recycling for each dwelling unit and all shared community rooms. OR For projects without that infrastructure, advocate to the local waste hauler or municipality for regular collection of recyclables.
CRITERIA 6 SUBTOTAL 3 of 5 Mandatory Criteria 2 Optional Points			
YES / NO	OPTIONAL POINTS	7. HEALTHY LIVING ENVIRONMENT	
Yes		M	7.1 Radon Mitigation <i>(Mandatory for New Construction and Substantial Rehab)</i> For New Construction in EPA Zone 1 areas, install passive radon-resistant features below the slab and a vertical vent pipe with junction box within 10 feet of an electrical outlet in case an active system should prove necessary in the future. For Substantial Rehab projects in EPA Zone 1, test before and after the retrofit and mitigate per the specified protocols.
Yes		M	7.2 Reduce Lead Hazards in Pre-1978 Buildings <i>(Mandatory for Substantial Rehab of Buildings Constructed Before 1978)</i> Conduct lead risk assessment or inspection to identify lead hazards. Control identified lead hazards using lead abatement or interim controls, using lead-safe work practices that minimize and contain dust.
Yes		M	7.3 Combustion Equipment For New Construction and Rehab projects: Specify power-vented or direct-vent equipment when installing any new combustion appliance for space or water heating that will be located within the conditioned space. If there are any combustion appliances within the conditioned space, install one hard-wired carbon monoxide (CO) alarm with battery backup function for each sleeping zone, placed per National Fire Protection Association (NFPA) 72. For Rehabs: If there is any combustion equipment located within the conditioned space for space or water heating that is not power-vented or direct-vent and that is not scheduled for replacement, conduct combustion safety testing prior to and after the retrofit; remediate as indicated.

Yes		M	<div>7.4 Garage Isolation</div> <div><div><div>• Provide a continuous air barrier between the conditioned space and any garage space to prevent the migration of any contaminants into the living space. Visually inspect common walls and ceilings between attached garages and living spaces to ensure that they are air-sealed before insulation is installed.</div><div>• Do not install ductwork or air handling equipment for the conditioned space in a garage.</div><div>• Fix all connecting doors between conditioned space and garage with gaskets or make airtight.</div><div>• Install one hard-wired CO alarm with battery backup function for each sleeping zone of the project, placed per NFPA 72 unless the garage is mechanically ventilated or an open parking structure.</div></div></div>
Yes		M	<div>7.5 Integrated Pest Management</div> <div>Seal all wall, floor, and joint penetrations with low-VOC caulking or other appropriate nontoxic sealing methods to prevent pest entry.</div>
Yes	10	M	<div>7.6 Smoke-Free Policy</div> <div><div>(Mandatory and Optional)</div><div>Mandatory: Implement and enforce a smoke-free policy in all common areas and within a 25-foot perimeter around the exterior of all residential buildings. Lease language must prohibit smoking in these locations and provide a graduated enforcement policy. Make the smoke-free policy readily available.</div><div>Optional: Expand the policy above to include all indoor spaces in the property.</div></div>
Yes	0	M	<div>7.7 Ventilation</div> <div><div>(Mandatory for New Construction and Substantial Rehab; Optional for Moderate Rehab)</div><div>For each dwelling unit in full accordance with ASHRAE 62.2-2010, install:<div><div>• A local mechanical exhaust system in each bathroom [3 points if Moderate Rehab]</div><div>• A local mechanical exhaust system in each kitchen [3 points if Moderate Rehab]</div><div>• A whole-house mechanical ventilation system [3 points if Moderate Rehab]</div></div>Verify these flow rates are either within +/- 15 CFM or +/- 15% of design value.</div><div>For each multifamily building of four or more stories, in full accordance with ASHRAE-162.1-2010, install:<div><div>• A mechanical ventilation system for all hallways and common spaces [3 points if Moderate Rehab]</div></div></div><div>For all project types, in addition to the above requirements:<div><div>• All systems and ductwork must be installed per manufacturer's recommendations</div><div>• All bathroom fans must be ENERGY STAR-labeled and wired for adequate run-time.</div><div>• If using central ventilation systems with rooftop fans, each fan must be direct-drive and variable-speed with speed controller mounted near the fan. Fans with design CFM 300-2000 must also have an ECM motor.</div></div></div></div>
Yes	5	M or 5	<div>7.8 Dehumidification</div> <div><div>(Mandatory for properties in Climate Zones 1A, 2A, 3A, and 4A following Criterion 5.2a, 5.2b, or 5.4. Optional for all other properties.)</div><div>Option 1: Design, select, and install supplemental dehumidification equipment to keep relative humidity OR</div><div>Option 2: Equip all dwelling units with dedicated space, drain, and electrical hook-ups for permanent supplemental dehumidification systems to be installed if needed and install interior RH monitoring equipment as described.</div></div>
	3	3	<div>7.9 Construction Pollution Management</div> <div><div>Option 1: Earn the EPA Indoor airPlus label</div><div>OR</div><div>Option 2: In all dwelling units, seal all heating, cooling, and ventilation return and supply floor ducts and returns throughout construction to prevent construction debris from entering. Flush all dwelling units after completion of construction and prior to occupancy for either 48 hours or with at least 14,000 ft3 per ft2 of floor area, then replace all air handling equipment filters.</div></div>
	3	3	<div>7.10 Noise Reduction</div> <div><div>Option 1: Test and demonstrate that noise levels in bedrooms meet 30 dB LAeq (continuous) and 45 dB LAmx, (single sound).</div><div>OR</div><div>Option 2: Provide a noise abatement plan specific to the site covering general noise mitigation techniques in accordance with 24 CFR 51B. OR</div><div>Option 3: Ensure all exterior wall and party wall penetrations are sealed with acoustical sealant, all party walls and floor/ceiling assemblies have an STC rating of at least 55, and exterior windows and doors in projects near a significant exterior noise source have an STC rating of at least 35</div></div>
	0	8	<div>7.11 Active Design: Promoting Physical Activity</div> <div><div>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</div><div>Option 1: Encouraging Everyday Stair Usage (buildings that include stairs as the only means to travel from one floor to another are not eligible for this option.) Provide a staircase that is accessible and visible from the main lobby and is visible within a 25-foot walking distance from any point in the lobby per the specifications listed. Place point-of-decision signage.</div><div>OR</div><div>Option 2: Activity Spaces. Provide on-site dedicated recreation space with exercise or play opportunities for adults and/or children that is open and accessible to all residents; see criterion for specifics.</div></div>
	0	8	<div>7.12 Beyond ADA: Universal Design</div> <div><div>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</div><div>Select and implement at least one of the Options with at least three different strategies in at least 75% units.</div><div>Option 1: Create welcoming and accessible spaces that encourage equitable use and social connections.</div><div>Option 2: Create spaces that are easy and intuitive to use and navigate.</div><div>Option 3: Promote safety and create spaces that allow for human error.</div><div>Option 4: Create spaces that can be accessed and used with minimal physical effort.</div><div>Option 5: Create spaces with the appropriate size and space to allow for use, whatever the user's form of mobility, size, or posture.</div></div>

0	8	<div>7.13 Healing-Centered Design</div> <div><div>(All projects must comply with at least one of either Criterion 7.11, 7.12, or 7.13. Points are not available for that criterion, but, are available for projects that meet two or three of these criteria.)</div><div>Select and implement at least two of the Options with at least two different strategies listed in at least 75% units.</div><div>Option 1: Provide an environment that promotes feelings of real and perceived safety.</div><div>Option 2: Create flexible spaces that allow for personalization and/or manipulation to meet individual and community needs.</div><div>Option 3: Connect residents and staff to a living landscape and the natural environment.</div><div>Option 4: Utilize art and culture in project design and programming and promote social connectedness.</div></div>
		<div>CRITERIA 7 SUBTOTAL</div> <div>8 of 8 Mandatory Criteria</div> <div>21 Optional Points</div>
YES / NO	OPTIONAL POINTS	8. OPERATIONS, MAINTENANCE + RESIDENT ENGAGEMENT
Yes	M	<div>8.1 Building Operations & Maintenance Manual and Plan</div> <div><div>(For all Multifamily projects)</div><div>Develop a manual with thorough building operations and maintenance (O&M) guidance and a complementary plan. The manual and plan should be developed over the course of the project design, development, and construction stages, and should include sections/chapters addressing the list of topics.</div></div>
Yes	M	<div>8.2 Emergency Management Manual</div> <div><div>(For all Multifamily projects)</div><div>Provide a manual on emergency operations targeted toward operations and maintenance staff and other building-level personnel. The manual should address responses to various types of emergencies, leading with those that have the greatest probability of negatively affecting the project. The manual should provide guidance as to how to sustain the delivery of adequate housing throughout an emergency and cover a range of topics, including but not limited to:<div><div>• communication plans for staff and residents</div><div>• useful contact information for public utility and other service providers</div><div>• infrastructure and building, "shutdown" procedures</div><div>• plan for regular testing of backup energy systems, if these exist</div></div></div></div>
Yes	M	<div>8.3 Resident Manual</div> <div>Provide a guide for homeowners and renters that explains the intent, benefits, use, and maintenance of their home's green features and practices. The Resident Manual should encourage green and healthy activities per the list of topics.</div>
Yes	M	<div>8.4 Walk-Throughs and Orientations to Property Operation</div> <div>Provide a comprehensive walk-through and orientation for all residents, property manager(s), and buildings operations staff.</div>
Yes	M	<div>8.5 Energy and Water Data Collection and Monitoring</div> <div>For rental properties, upload project energy and water performance data in an online utility benchmarking platform annually for at least five years from time of construction completion per one of the four methods provided; grant Enterprise view access for that period. For owner-occupied units, collect and monitor utility data in a manner that allows for easy access and review.</div>
		<div>CRITERIA 8 SUBTOTAL</div> <div>5 of 5 Mandatory Criteria</div> <div>0 Optional Points</div>
		<div>TOTAL</div> <div>36 of 40 Mandatory Criteria</div> <div>72 Optional Points</div>

ENTERPRISE GREEN COMMUNITIES NARRATIVE

Enterprise Green Communities 2020 - Rating System Narrative
49 6th Street (Sacred Heart) Redevelopment

The project team comprised of POAH, Urban Spaces, and DMS Design proposing the adaptive reuse of the Sacred Heart Rectory, School, and Convent as 100% affordable housing has determined that the Enterprise Green Communities path is both achievable given the limitations of a historic rehab and will provide extensive benefit to the project given the emphasis on environmental sustainability as well as its focus on resident-centered health and quality of life considerations. As shown in the EGC Checklist, the Project meets all requirements and scores 72¹ Optional Points, exceeding the required 35 for substantial rehabs.

1. Integrative Design

The Project will meet all of the required Integrative Design components as detailed in 1.1-1.4, with Enterprise Green Communities’ principles informing decisions from pre-development through construction management. Using helpful tips from Enterprise Green Communities’ Participatory Design Toolkit, the team has worked to solicit feedback in the planning stage from community members and centered design decisions on the interests and needs of potential future residents. This input has influenced decisions as fundamental as the unit mix and family size served, shifting the proposed project from studios and 1-bedrooms to a program comprised almost entirely family-sized apartments up to 3 and 4 bedrooms, to more fine-grain details such as the layout of the bicycle rooms, incorporating a flexible parking solution for visiting aides and service providers, and the programming of the shared green space. The Enterprise Green Communities Design criteria will be incorporated in the construction documents in the Specifications Division 1 section to ensure that the requirements are integral to the general contractor’s preparation for the Project and ensure that the requirements are met with intermediate benchmarks throughout the construction process.

2. Location and Neighborhood Fabric

This adaptive reuse was intentionally chosen as an excellent location for the proposed affordable, family-sized apartments, in an East Cambridge neighborhood with extremely strong family-focused amenities within walking distance including transit, libraries, public schools, restaurants, green and open space, large employers, etc.

The Project meets all of the mandatory requirements: it achieves all of the requirements related to sensitive site protection (2.1), connects to existing development and infrastructure (2.2), achieves and exceeds the compact development requirements (2.3), and satisfies the proximity to services and

community resources standards (2.5). In addition, the Project achieves 27 optional points with the following detail and backup information:

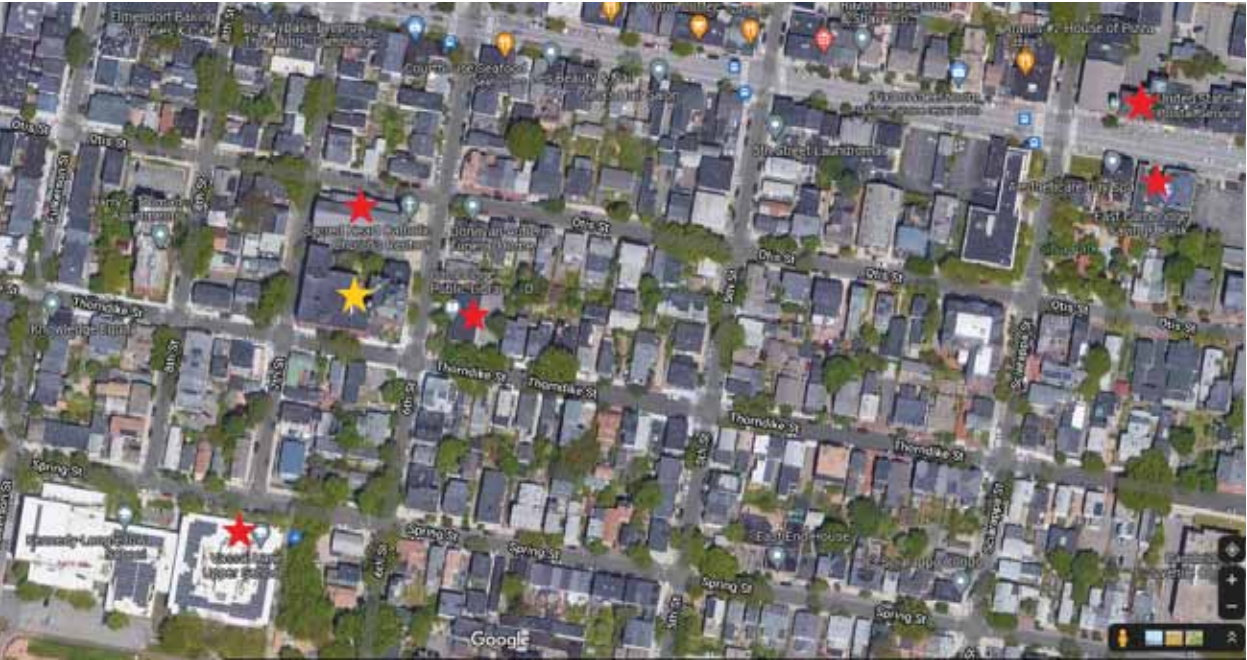
2.3 Increased Compact Development

The Project will have a residential density of 100 dwelling units per acre (46 units/0.46 acres). The average residential density in the surrounding community is 13 dwelling units per acre. The Project is over 7x as dense (7 points, by exceeding by anything more than 3x).

2.5 Proximity to Services and Community Resources

The Project meets this requirement by being located within a half mile walk to at least 4 listed services:

- Public Library - .01 miles walking
- Church – Sacred Heart Catholic Church – 0.01 miles walking
- School – Vassal Lane Upper School: .08 miles walking
- 12-14 restaurants on Cambridge Street within a quarter mile of walking
- Post Office – 0.28 miles walking
- Bank – East Cambridge Savings Bank – 0.28 miles walking



¹ This scoring assumes that the building receives the 15 optional points for being all-electric, as is our preferred route. If it is determined that natural gas powered domestic hot water is necessary, the system will be installed to be easily converted to electric and the project still achieves the 35 minimum optional points with 57.

2.7 Access to Open Space

Access to safe open space and other natural resources improves quality of life and enhances opportunities for physical activity and social interaction/connection. The Project is a 0.12 mile walk to dedicated public open space (John A Ahern Field), which has 1.3 acres of unpaved open space.



2.8 Access to Transit

Housing located near transit reduce a household’s need to own or rely upon a car, thereby eliminating or lowering the costs of auto ownership and the related environmental impacts. The Project is a 0.07 mile walk to transit (bus); the MBTA 69 route on Cambridge Street which has orders of magnitude over 45 transit rides per weekday, with busses coming every 10-12 minutes during peak hours, and consistent weekend service, connecting Harvard Square to the Green Line train at Lechmere Station (6 points). The Project is also 300 feet from Class II bike lanes connecting to the Green Line train at Lechmere Station (2 points).



2.9 Improving Connectivity to the Community

Connections to adjacent development and public, open spaces promote recreational walking, biking and alternative means of commuting as well as other healthy lifestyle choices. The Project will: provide secure, lockable, sheltered, and accessible bicycle storage; provide at least one bicycle parking space for every residential unit; post signage directing residents to bicycle parking areas and programs (2 points).

2.11 Adaptive Reuse of Buildings

The reuse of existing structures reduces landfill waste, reduces the need for new materials, and reduces pressure to develop undeveloped land. The Project proposes the rehabilitation of a

structure not previously used for housing, with the majority of existing structure and envelope preserved in compliance with historic tax credit requirements (6 points).

3. Site Improvement

The Project plans to incorporate a number of measures to minimize environmental impact, ensure healthy environments for future residents, and reduce the burden on existing infrastructure. The Project will incorporate all required elements in this section – investigating and performing any required environmental remediation, implementing required steps to minimize disturbance during staging and construction, incorporating all-native plantings, and treating and retaining the maximum amount of stormwater feasible during a 60th percentile precipitation event – as well as achieve 4 optional points for efficient irrigation and water re-use.

4. Water

Water conservation translates into direct utility savings for residents and building owners and lowers infrastructure costs associated with stormwater management and water treatment facilities. Water efficient appliances save water and conserve energy. The Project will reduce total indoor water consumption by at least 30% compared to the EGC baseline indoor water consumption chart, achieving 3 optional points. In addition, any new toilet, showerhead, and/or faucet that is installed in the project will be WaterSense® certified.

5. Operating Energy

The Project will satisfy the mandatory for Rehab 5.1b components by providing projected operating energy use intensity and projected operating building emissions intensity, conducting commissioning for compartmentalization, insulation installation, and HVAC systems, and achieving the performance standard required under the appropriate HERS rating. The project will aim to achieve the optional solar ready and the additional reductions in energy use points, but until the sizing and location of the rooftop mechanical equipment is more fully established and the mechanical systems more fully developed in construction drawings, we did not include these points in our Optional Points total. As long-term owners, POAH always endeavors to include solar PV and highly efficient mechanical systems and envelope assemblies at all of our properties whenever feasible. At a minimum, all appliances will be Energy Star rated, heating and cooling equipment will be selected and sized in accordance with ACCA manuals J and S, and lighting will be highly efficient in accordance with the EGC requirements. The Project does intend to specify all-electric heating, cooling, and ventilation systems, as well as electric domestic hot water. The heating and cooling system proposed is a Mitsubishi Variable Refrigerant Flow (VRF) air-source heat pump (ASHP) with Refrigerant-to-Hydronic Exchange System (HEX), Hydronic Condenser Loop, and Water Source Heat Pumps (WSHPs). Electric domestic hot water is the one system that has proven most challenging from a cost and operational perspective with the current technology and options available, and while the project intends to use air source heat pumps for domestic hot water, this approach will be compared against a natural gas-powered system to weigh the costs and benefits. Using natural gas is not our intent and POAH always intends to de-carbonize our projects to the

extent financially feasible. If we are not able to achieve the 15 optional all-electric points, the Project is not at risk of not achieving EGC’s minimum optional point threshold.

6. Materials

Material selection determines significant environmental and health impacts. The project will select materials that exceed the required EGC VOC content limits, avoid carpeting as a flooring option, exceed any formaldehyde requirements for insulation and composite wood, use materials with durable, cleanable surfaces throughout bathrooms, kitchens, and laundry rooms, and use moisture-resistant backing materials per ASTM # D 6329 or 3273 behind tub or shower enclosures. Moisture will be managed to the extent possible given the existing historic building and limited access to the foundation. The Project will develop and implement a waste management plan that reduces non-hazardous construction and demolition waste through recycling, salvaging, or diversion strategies and maintain documentation on the diversion rate. By carefully preserving the historic façade and building, the Project avoids large-scale demolition and the need to recycle materials listed in the EGC optional points list (masonry, brick, concrete, etc) is minimized or avoided entirely. The Project is achieving 2 optional points by providing separate bins for the collection of trash and recycling.

7. Healthy Living Environment

The project team recognizes that a healthy environment is critical for the families who will build their lives here, and will make decisions through design, construction, and operation that will reduce exposure to toxins, ensure a healthy indoor environment, and promote health through design. As required, the project will test and mitigate radon if present at unhealthy levels and conduct a lead risk assessment and inspection and abate any identified hazards. To the extent that there are any combustion appliances, which are not planned, those would be vented and monitored as required under EGC. Similarly, there are not any garage spaces so the need to isolate and risk of harmful effects of exhaust fumes is not applicable. All floor, wall, and joint penetrations will be sealed by low-VOC caulking or other appropriate sealant as a part of an integrated pest management plan. To ensure healthy indoor air quality, the property will enforce a no smoking policy that includes all indoor spaces and a perimeter around the building. Ventilation will include in kitchens and bathrooms, as well as a building-wide balanced ventilation with recovery; the system will either be per floor ERVs or rooftop mounted ERVs, and fresh air will be ducted to each bedroom and kitchen and bath exhaust will be captured by the ERV. The Project receives 5 optional points by providing dehumidification to keep relative humidity below 60%; 3 optional points by satisfying the construction pollution management requirement to seal all heating, cooling, and ventilation return and supply floor ducts and returns throughout construction to prevent construction debris from entering, flushing all dwelling units after completion of construction and prior to occupancy for either 48 hours or with at least 14,000 ft³ per ft² of floor area; and 3 optional points for noise reduction by demonstrating the minimum required noise reduction metrics (30 dB LAeq (continuous) and 45 dB L_{Amax}, (single sound)). The Project will also utilize active design features that emphasize outdoor recreation and a centrally located primary staircase with design decisions encouraging use.

8. Operations, Maintenance, and Resident Engagement

As the long-term owner, POAH understands that ongoing operations, maintenance, and resident support are critical to the success of the project. The high-efficiency mechanical systems will not

function to their full potential if the owner fails to provide sufficient resident education, and corrective actions if needed need to be informed by accurate and ongoing usage data. For all projects, POAH provides property staff with a building operations and maintenance plan and includes the maintenance and management staff in the commissioning and handoff process with the contractor and ClearResult as commissioning engineer. POAH management staff is provided with an emergency management manual to better equip staff to respond appropriately and effectively to emergency situations. Residents receive a resident manual at move-in that includes the intent, benefits, use, and maintenance of their home's green features and incorporates tips for reducing energy usage and waste generation. A comprehensive walkthrough will orient property staff before resident move-ins have started. Finally, the Project will upload project energy and water performance data in an online utility benchmarking platform annually for at least five years from time of construction completion.

NET ZERO NARRATIVE



Green Building Requirements

Net Zero Narrative



Last Updated – 2/23/2021

Introduction

The “Net Zero Narrative” is required for projects subject to Green Building Requirements, Section 22.20 of the Cambridge Zoning Ordinance. The requirement is based on the recommendations of the City’s Net Zero Action Plan (adopted in 2015), which seeks to neutralize greenhouse gas emissions in Cambridge by 2050. This plan sets a timeframe of 2025 for most new construction to be designed to a “net zero” standard, meaning that on an annual basis, all greenhouse gas emissions resulting from building operations are offset by carbon-free energy production. In the meantime, the goal is to reduce greenhouse gas emissions to the maximum extent possible, and to design and develop buildings to adapt to net zero emissions in the future.

This Net Zero Narrative is provided for advisory review only. It is intended to inform City staff and officials on how the Net Zero Action Plan has influenced the design of the project, and to begin a dialogue so that all parties can better understand what building improvements are possible and what the major barriers are to achieving net zero emissions. As research, design, and development of the project continues to unfold, this narrative must be updated and included in the submission for the Building Permit and Certificate of Occupancy.

Example Narrative Template

This document provides an example format for the Net Zero Narrative as a guide for developers and designers. Variations are appropriate to account for the unique conditions of a case. However, any Net Zero Narrative must include the components set forth in Paragraph (c), Section 22.25.1 of the Zoning Ordinance:

- (1) *anticipated building envelope performance, including roof, foundation, walls and window assemblies, and window-to-wall ratio;*
- (2) *anticipated energy loads, baseline energy simulation tool assumptions, and proposed energy targets, expressed in terms of site energy use intensity (“EUI”), source EUI, and total greenhouse gas emissions;*
- (3) *description of ways in which building energy performance has been integrated into aspects of the Green Building Project’s planning, design, and engineering, including building use(s), orientation, massing, envelope systems, building mechanical systems, on-site and off-site renewable energy systems, and district- wide energy systems;*
- (4) *description of the technical framework by which the Green Building Project can be transitioned to net zero emissions in the future (acknowledging that such a transition might not be economically feasible at first), including future net zero emissions options for building envelope, HVAC systems, domestic hot water, interior lighting, and on- and off-site renewable energy sources;*
- (5) *description of programs provided by local utility companies, government agencies, and other organizations that provide technical assistance, rebates, grants, and incentives that can assist in achieving higher levels of building performance, summarizing which entities have been contacted and which programs could be utilized in the Green Building Project; and*
- (6) *assessment of the technical and financial feasibility to meet the projected HVAC and domestic hot water demands of the building as noted above in (2) using energy systems that do not consume carbon-based fuels on-site compared to code-compliant energy systems that consume carbon-based fuels on-site, which shall include the cost of installation, maintenance and upkeep of the energy system and its components (incorporating programs and incentives as noted above in (5)).*

Net Zero Narrative – EXAMPLE TEMPLATE Project Name/

Address: Sacred Heart, 49 Sixth Street

Submitted By: Preservation of Affordable Housing

Date of Submission:

Project Profile

Development Characteristics

Lot Area (sq.ft.):	19,865 sf
Existing Land Use(s) and Gross Floor Area (sq.ft.), by Use:	vacant (former rectory, school); 59,400 sf
Proposed Land Use(s) and Gross Floor Area (sq.ft.), by Use:	residential, 59,400 sf
Proposed Building Height(s) (ft. and stories):	5 stories 65' - 6"
Proposed Dwelling Units:	46
Proposed Open Space (sq.ft.):	5,100 sf
Proposed Parking Spaces:	0
Proposed Bicycle Parking Spaces (Long-Term and Short-Term):	52 long-term

Green Building Rating System

Choose the Rating System selected for this project:

LEED-Leadership in Energy & Environmental Design (U.S. Green Building Council)			
Rating System & Version:		Seeking Certification?*	No
Rating Level:		# of Points:	

Enterprise Green Communities			
Rating System & Version:	EGC 2020	Seeking Certification?*	Yes
Rating Level:		# of Points:	72

Passive House Institute US (PHIUS) or Passivhaus Institut (PHI)			
Rating System & Version:		Seeking Certification?*	No

*NOTE: Certification is not required through the Green Building Requirements. However, you may choose to indicate if the Project Team intends to pursue formal certification through these Green Building Rating Programs (or their affiliates).

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Proposed Project Design Characteristics

Building Envelope

Assembly Descriptions:

Roof:	The roof will be replaced with th addition of insulation to an R value of 40
Foundation:	Existing foundation to remain
Exterior Walls:	Existing exterior walls to remain. If possible a foam injection process will be used to improve the thermal performance (R-value) of the walls.
Windows:	All windows will be replaced with high performance historic windows.
Window-to-Wall Ratio:	22%
Other Components:	

Envelope Performance:

Provide estimates of the thermal transmittance (U-value) for the building envelope compared to “Baseline” standards required by the Massachusetts Stretch Energy Code, latest adopted edition.

	Proposed		Baseline (existing bldg.)	
	Area (sf)	U-value	Area (sf)	U-Value
Window	7,400	.25	7,400	.50
Wall	34,400	.07	34,400	.25
Roof	11,750	.02	11,750	.25

Envelope Commissioning Process:

Enhanced commissioning will be provided for the enclosure and the HVAC systems. The enclosure will be evaluated to determine what insulation can be added to improved thermal performance. Existing windows will be removed to determine how to install new windows with proper flashing and air sealing details. Blower door tests will be done before construction, during (for diagnostics) and post construction. An air tightness reduction goal will be established.

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Building Mechanical Systems

Systems Descriptions:

Space Heating:	Proposing Mitsubishi Variable Refrigerant Flow (VRF) Air-Source Heat Pump (ASHP) with Refrigerant-to-Hydronic Exchange System (HEX), Hydronic Condenser Loop, and Water Source Heat Pumps (WSHPs)
Space Cooling:	Same as system described above.
Heat Rejection:	NA
Pumps & Auxiliary:	NA
Ventilation:	A balanced ventilation will be provided with recovery. The system will either be per floor ERVs or rooftop mounted ERVs. Fresh air will be ducted to each bedroom, kitchen and bath exhaust will be captured by ERV.
Domestic Hot Water:	Ideally the project will include air source heat pump for DHW. Given the cost of electricity compared to natural gas the DHW may have to be a gas powered system
Interior Lighting:	LED lighting will be provided in all locations.
Exterior Lighting:	LED lighting will be provided in all locations.
Other Equipment:	All plumbing fixtures will be low-flow, .86 gpf toilets, .5 gpm bath faucets, 1.5 gpm kitchen faucets, 1.5 gpm shower heads.

Systems Commissioning Process:

Enhanced commissioning (CX) will be provided for the enclosure and the HVAC systems. The CX agent will provide guidance on system selection, energy modeling, ongoing design review, on-site system installation review and final CX will be provided on all systems.

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Building Energy Performance Measures

Overview
Broadly describe the ways in which building energy performance has been integrated into the following aspects of the project’s planning, design, engineering, and commissioning. More detail on specific measures can be provided in appendices.

Land Uses:	Affordable Housing
Building Orientation and Massing:	This project is an adaptive use of an existing building. There will be no changes to the building orientation and massing.
Envelope Systems:	Given the historic designation of the buildings, energy updates to the enclosure are limited. All windows will be replaced with historic simulated windows, to the extent possible insulation will be added to the interior of all exterior walls, and the roof will be replaced with added insulation to improve the thermal performance of the enclosure.
Mechanical Systems:	The currently proposed systems include: Mitsubishi Variable Refrigerant Flow (VRF) Air-Source Heat Pump (ASHP) with Refrigerant-to-Hydronic Exchange System (HEX), Hydronic Condenser Loop, and Water Source Heat Pumps (WSHPs)
Renewable Energy Systems:	A solar PV feasibility was performed that provides the annual production that might be achieved at this building.
District-Wide Energy Systems:	The project isn't large enough at this point to be a part of a district-wide energy system. We will, however, take advantage of solar net metering to reduce out energy burden with an off-site PV array.
Other Systems:	

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Integrative Design Process
Describe how different parties in the development process (owners, developers, architects, engineers, contractors, commissioning agents) have collaborated in the design. Include the Basis of Design and Owner’s Project Requirements and describe how they have been informed by planning activities such as meetings or design charrettes. Describe how continuing collaborative processes will inform Schematic/Design and Construction Documents.

<p>The design team collaborated with MEP, sustainability consultants, and landscape architects on the preliminary conceptual designs to create a site plan and building redevelopment scheme that reuses historic materials by preserving the historic bank building, and brings future-looking energy reduction strategies to bear. The design team will continue to work with an integrated and cross-disciplinary approaches they work together to identify energy- and water-saving building systems.</p> <p>The sustainability consultant will iteratively assess multiple scenarios and provide the team with information about each of the systems options and advise on the right selection for a combination of sustainability and health goals, plus financial feasibility. Energy and water use targets will also be further refined and set during the schematic design stage. The early analyses will help inform the owner’s project requirements (OPR) and the project basis of design (BOD). POAH will help set the basic requirements through their Basis of Design standards.</p>

Green Building Incentive Program Assistance
Describe any programs applicable to this project that would support improved energy performance or reduced greenhouse gas emissions, and which of those programs have been contacted and may be pursued. Programs may be offered by utility companies, government agencies, and other organizations, and might include rebates, grants, financing, technical assistance, and other incentives.

<p>Mass Save (either NC MFHR (whole building) and/or prescriptive, or LEAN). Depending on path this could be support for feasibility, energy modeling, and equipment. MA DOER for Alternative Energy Credits (AECs) on air source heat pump or other clean heating technology.</p>
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Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Net Zero Scenario Transition

Describe the technical framework by which the project can be transitioned to net zero greenhouse gas emissions in the future, acknowledging that such a transition might not be economically feasible at first. This description should explain the future condition and the process of transitioning from the proposed design to the future condition.

	Net Zero Condition:	Transition Process:
Building Envelope:		Historic nature of project limits path to Net Zero. If new technology becomes available (i.e. windows, interior wall insulation, etc.) those can be considered in a future rehab.
HVAC Systems:	Current system is planned to be all electric.	
Domestic Hot Water:	Project goal is electric DHW system. If necessary for operational cost reasons the system may have to fed from natural gas.	If natural gas DHW system in installed, it will be designed to be converted to electric.
Lighting:	All lighting will be the lowest energy use available.	All lighting will be the lowest energy use available. As better lamps/fixtures are available we can replace.
Renewable Energy Systems:	Roof space and building density do not allow for full production of electricity for the building loads. Evaluate off-site solar production available.	Purchase off-site renewables.
Other Strategies:		

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Energy Systems Comparison

Overview

This section should describe the results of an analysis comparing the technical and financial feasibility to meet the projected HVAC and domestic hot water demands of the building using energy systems that do not consume carbon-based fuels on-site compared to code-compliant energy systems that consume carbon-based fuels on-site.

The only system that may be fossil fuel is DHW. The project goal is to use heat pump DHW heaters powered by electricity. If a fossil fuel system is incorporated it will be desgined to easily convert to electric.

Assumptions

Describe what building energy systems were included and excluded in your analysis and why.

	Included in analysis?		Describe the systems for which this was analyzed or explain why it was not included in the analysis:
	Yes	No	
Solar Photovoltaics:	X		
Solar Hot Water:		X	Roof area is small and more effective to use for Photovoltaics.
Ground-Source Heat Pumps (Geothermal):	X		No locations for enough wells to support this type of system.

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Water-Source Heat Pumps:			Water-source heat pumps are part of the heating and cooling system proposed.
Air-Source Heat Pumps:			NA
Non-Carbon-Fuel District Energy:			NA
Other Non-Carbon-Fuel Systems:			NA

Non-Carbon-Fuel Scenario

Describe the final scenario used in this analysis.

To the extent possible the project will be all electric, include making the existing enclosure as robust as allowed by the National Park Service (NPS) and State Historic Preservation Office (SHPO). Historic buildings pose a significant challenge to achieve net zero within the budget for this project. Future technology advancements in windows and PV panel performance might permit the building to get closer to net zero in

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:
Submitted By:
Date of Submission:

Total Roof Area (sq. ft.):	11,750 sf
Unshaded Roof Area (sq. ft.):	11,750 sf
Structural Support:	It is anticipated that the PV array can be either a ballasted attachment or mechanically fastened to the roof structure.
Electrical Infrastructure:	tbd
Other Roof Appurtenances:	The PV feasibility study took into consideration any roof appurtenances that might shade the array to determine layout and annual production.
Solar-Ready Roof Area (sq. ft.):	
Capacity of Solar Array:	Preliminary feasibility study shows that an 84.2 kW array is possible.
Financial Incentives:	MA DOER for SMART incentives, lower energy bills, ITC credits.
Cost Feasibility:	

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:

Submitted By:

Date of Submission:

Results

Briefly summarize the results of the analysis and how it has informed the design of the project. Also include figures for the “Non-Carbon-Fuel Scenario” in the concluding Summary Table at the end of the Net Zero Narrative. Attachments can be provided with more specific figures and metrics regarding installation, maintenance, and upkeep costs (exclusive of operating fuel expenses), but a full report is not necessary.

	Proposed Design		Non-Carbon-Fuel Scenario	
	Installation Cost	Maintenance Cost	Installation Cost	Maintenance Cost
Space Heating	32k/unit		32k/unit	
Space Cooling	included in 32k		included in 32k	
Heat Rejection				
Pumps & Aux.				
Ventilation	included in 32k		included in 32k	
Domestic Hot Water	7k/unit		8k/unit	
(Financial Incentives)				
Total Building Energy System Cost				

With a goal of an all electric system, we did not evaluate a non-carbon fuel scenario for heating, cooling and ventilation. We are still evaluating the operational cost of fossil fuel DHW versus an all electric DHW system. From past experience we are confident an all electric DHW system won't cost more that a fossil fuel system, especially since we need all new distribution piping.

Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:

Submitted By:

Date of Submission:

Anticipated Energy Loads and Greenhouse Gas Emissions

Assumptions

Describe the assumptions and methodology used to conduct preliminary energy modeling and set energy targets for the project. Specifically describe what components of the building were included and excluded.

The existing buildings are unoccupied and have been for several years. We have no data on use or cost so unable to establish a baseline. We would expect to improve the building EUI by 25-30% and if financially feasible to add a PV system producing the maximum feasible on the existing roof.

Annual Projected Energy Consumption and Greenhouse Gas (GHG) Emissions

The preliminary energy modeling results should be shown in a concluding table format similar to what is shown at the end of this document. It should compare the “baseline building” (Massachusetts Stretch Energy Code) to the proposed design, as well as the future “net zero” scenario described later in this narrative.

TBD	Baseline Building		Proposed Design		Future Net Zero Scenario		Non-Carbon-Fuel Scenario	
	kWh or Therms	% of Total	kWh or Therms	% of Total	kWh or Therms	% of Total	kWh or Therms	% of Total
Space Heating								
Space Cooling								
Heat Rejection								
Pumps & Aux.								
Ventilation								
Domestic Hot Water								
Interior Lighting								
Exterior Lighting								
Misc. Equipment								
	\$US, kBTU, kBTU/SF		\$US, kBTU, kBTU/SF	% Reduction from Baseline	\$US, kBTU, kBTU/SF	% Reduction from Baseline	\$US, kBTU, kBTU/SF	% Reduction from Baseline
Site EUI								
Source EUI								
Total Energy Use*								
Total Energy Cost *								
	kWh or Therms	% Total Energy	kWh or Therms	% Total Energy	kWh or Therms	% Total Energy	kWh or Therms	% Total Energy
On-Site Renewable Energy Generation								
Off-Site Renewable Energy Generation								
	Tons CO ₂ [/SF]		Tons CO ₂ [/SF]	% Reduction from Baseline				
GHG Emissions								
GHG Emissions per SF								

It may be helpful to present this information in a chart or graph. The following page provides examples.

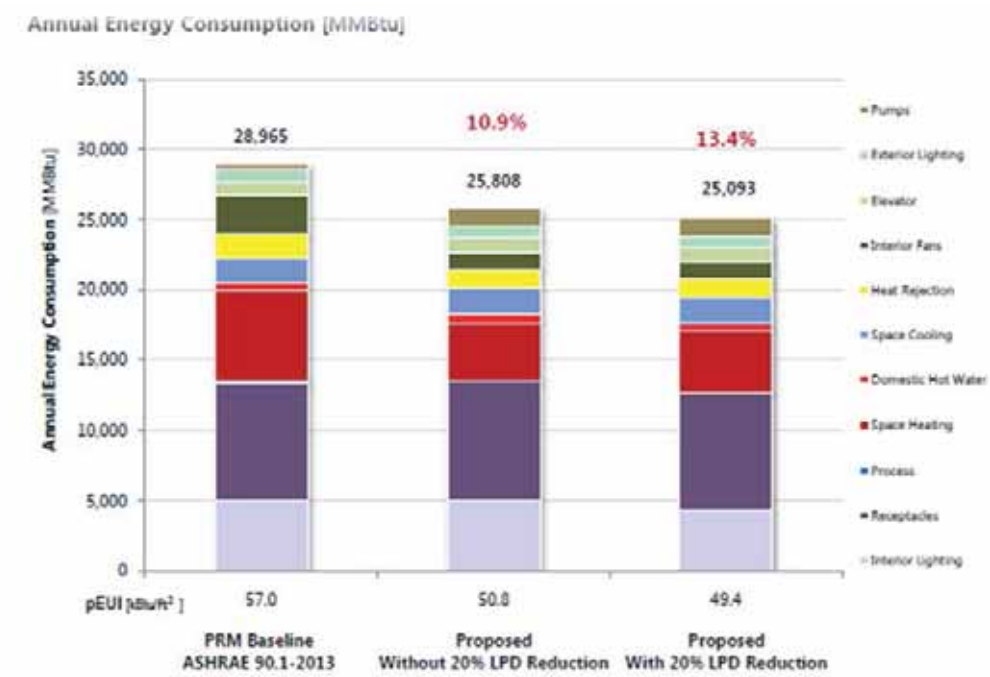
Net Zero Narrative – EXAMPLE TEMPLATE

Project Name/Address:

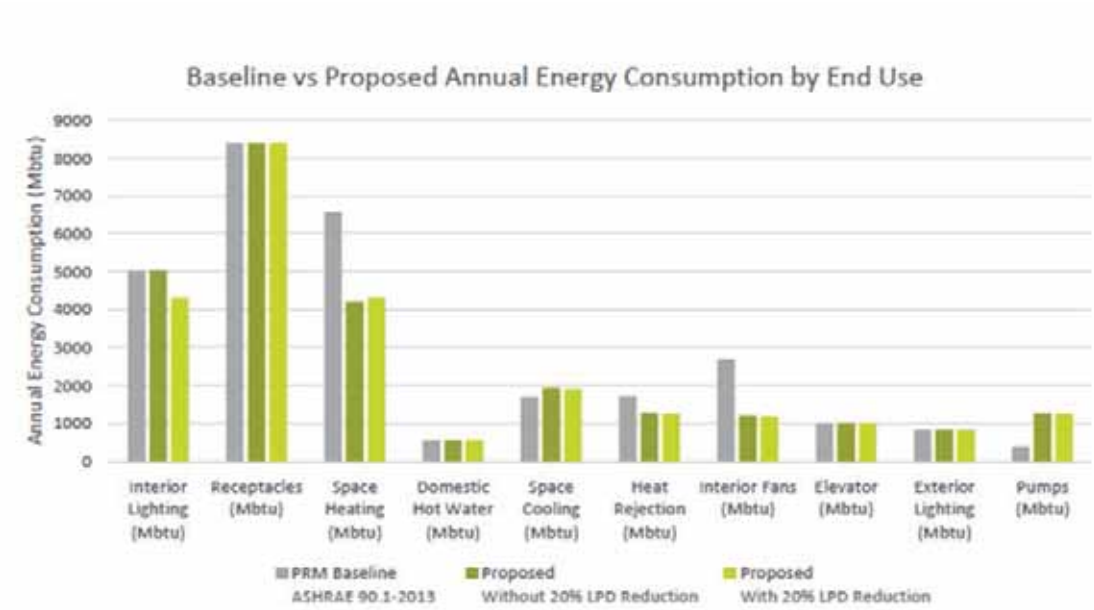
Submitted By:

Date of Submission:

Example Chart 1:



Example Chart 2:



SunBug Solar[®]

December 15, 2021 | V1 | Solar Feasibility Study for

P O A H

49 Sixth Street, Cambridge, Massachusetts

SunBug Solar®

R E S P O N S I V E .

R E S O U R C E F U L .

R E L I A B L E .



49 Sixth Street

59.6 kW DC

Production (yr 1): 58,706 kWh*

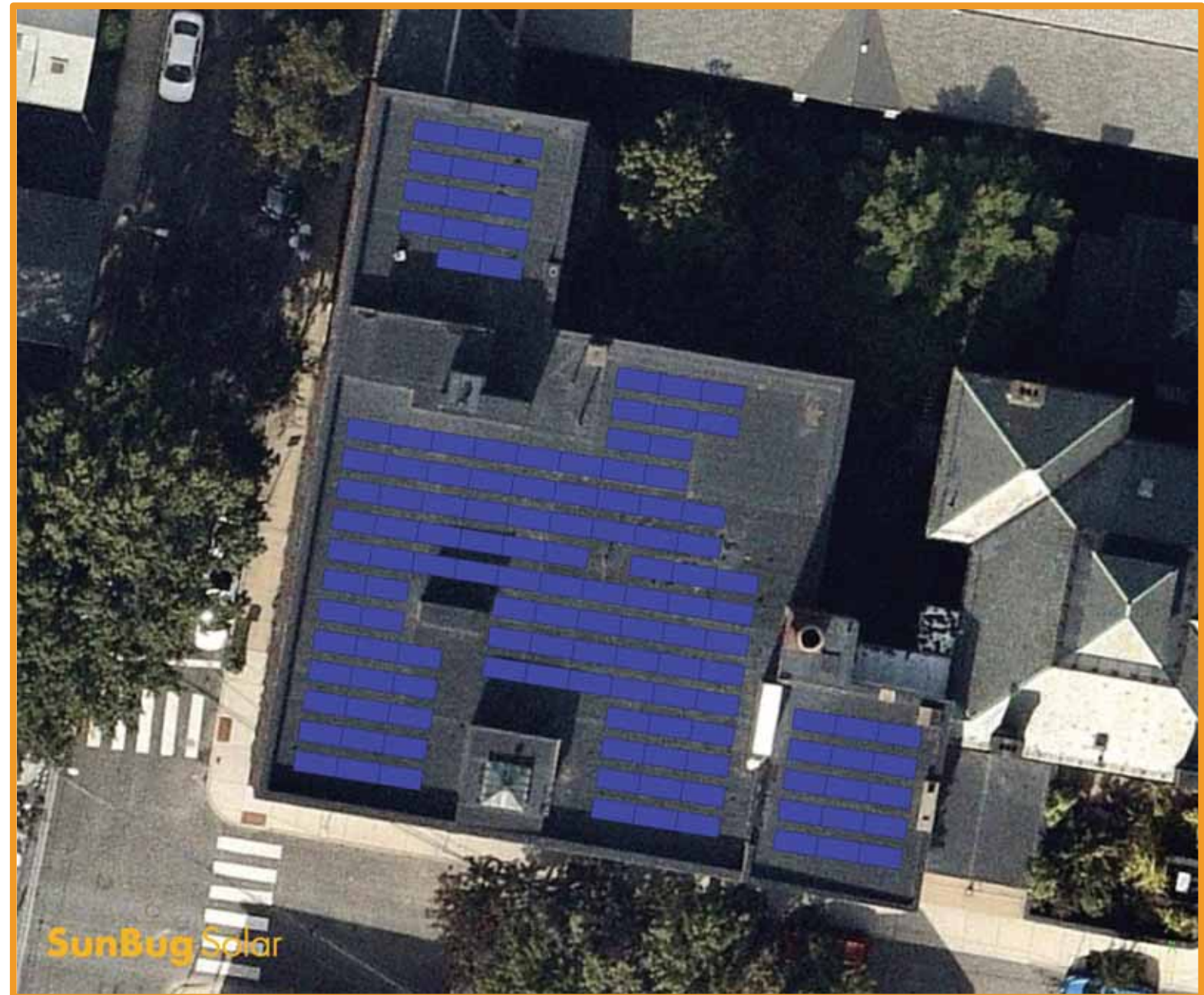
Equipment

- Panels:
LG, 72-cell, 455-watt**
- Inverters:
SolarEdge 43.2kW, 208v***
- Ballasted Racking:
EcoFoot2+
(some penetrations may be required)

* Assumes yield (kWh/kWp) of 985.

** Panel manufacturer and wattage is subject to change. Final panel will be Tier-1 per Bloomberg 2021/2022.

*** Assumes facility's electric service is 3P 208V.



rooftop mechanicals will be located on the roof and the array will need to be adjusted accordingly once that is engineered

49 Sixth Street

84.2 kW DC

Production (yr 1): 75,359 kWh*

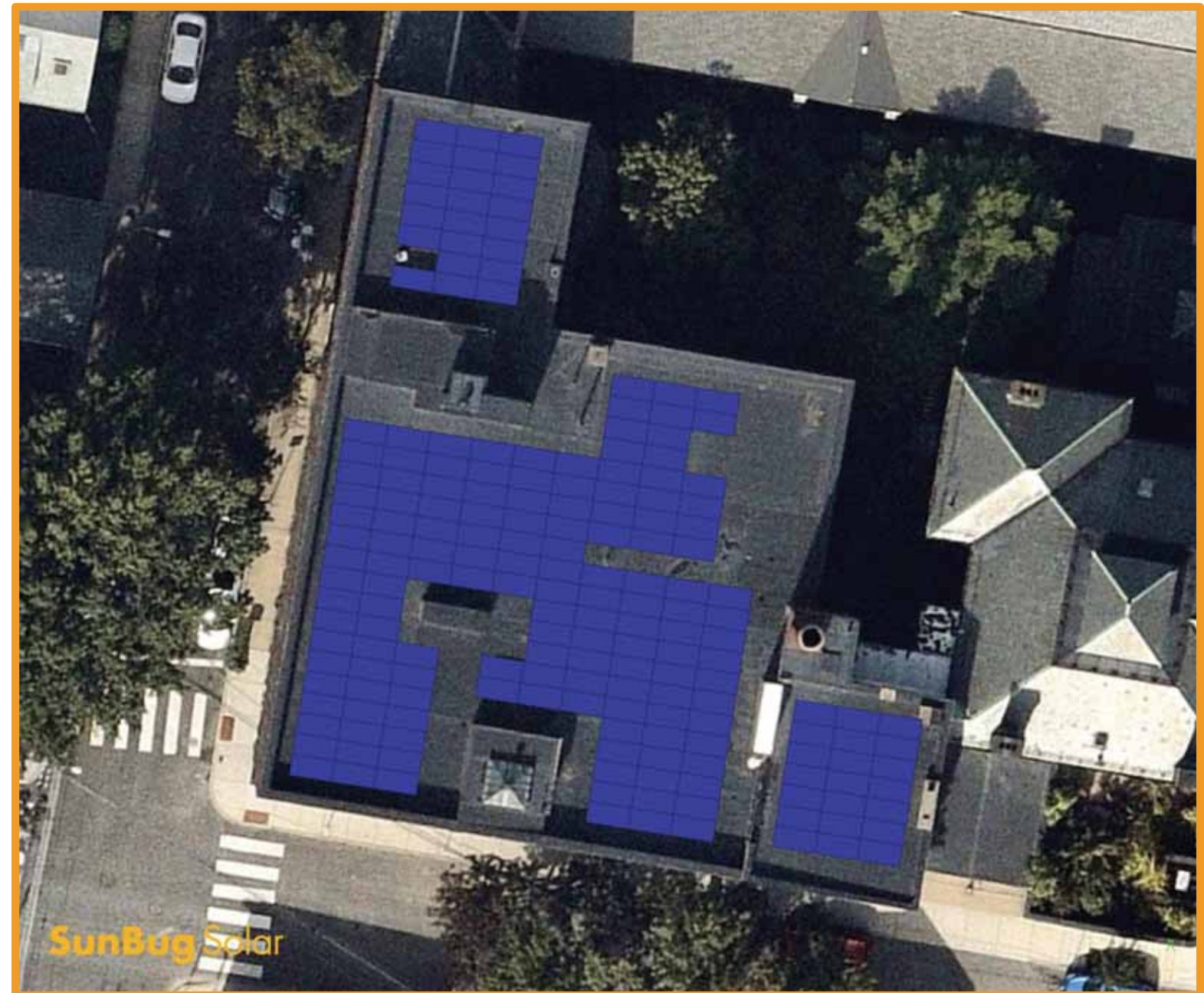
Equipment

- Panels:
LG, 72-cell, 455-watt**
- Inverters:
SolarEdge 43.2/14.4kW, 208v***
- Attached Racking:
SnapNrack
(flushed attachments required)

* Assumes yield (kWh/kWp) of 895.

** Panel manufacturer and wattage is subject to change. Final panel will be Tier-1 per Bloomberg 2021/2022.

*** Assumes facility's electric service is 3P 208V.



NOTES

- *The roof of 49 Sixth street is a suitable target for solar, with sufficient space for either a ballasted or attached solar array. Because of the building's height, increased wind uplift would likely require attachments on the ballasted system as well.*
- *The smokestack and other rooftop structures pose some challenges with regard to shading, but all panels included in the layouts would produce during peak solar months.*
- *The larger, attached layout design provides a higher annual production, but does so with a lower yield (kWh/panel/year). This is because the attached design lies flat, while the ballasted design positions the panels at a 10-degree tilt to the south.*

SunBug Solar[®]

R E S P O N S I V E . R E S O U R C E F U L . R E L I A B L E .

Nick d'Arbeloff

Vice President, Commercial Business

T: 617-858-0077

E: nick.darbeloff@sunbugsolar.com

GREEN BUILDING PROFESSIONAL AFFIDAVIT

Affidavit Form for Green Building Professional Special Permit

Green Building

Project Location: 49 Sixth Street Cambridge MA 02141**Green Building Professional**Name: Michael Schofield☐ Architect☐ Engineer

License Number: _____

Company: ClearesultAddress: 50 Washington Street, Westborough, MA 01581

Contact Information

Email Address: mike.schofield@clearesult.comTelephone Number: 508-365-3204

I, Michael Schofield, as the Green Building Professional for this Green Building Project, have reviewed all relevant documents for this project and confirm to the best of my knowledge that those documents indicate that the project is being designed to achieve the requirements of Section 22.24 under Article 22.20 of the Cambridge Zoning Ordinance.


(Signature)

12/16/2021

(Date)

Attach either:

- ☐ Credential from the applicable Green Building Rating Program indicating advanced knowledge and experience in environmentally sustainable development in general as well as the applicable Green Building Rating System for this Green Building Project.
- ☒ If the Green Building Rating Program does not offer such a credential, evidence of experience as a project architect or engineer, or as a consultant providing third-party review, on at least three (3) projects that have been certified using the applicable Green Building Rating Program.



City of Cambridge, MA

Last Updated: May, 2020



[Green Certification Details](#) [Green Portfolio Overview](#) [Certification Map](#) [Jefferson Park - High Rise](#) ▼

[Manning Apartments](#) ▼

The project has been certified!

Project Overview

PROJECT INFORMATION ▼

Project Name Manning Apartments

Name of Co-Sponsor or JV Partner ⓘ

Street Address ⓘ 237 Franklin Street

Type of Project Multi-Family > 4 stories ▼

City Cambridge

Number of Buildings 1

State MA ▼

Total Project Square Feet ⓘ 160010

Zip Code 02139

Total Lot Size 0



INCOME

UNITS

199

0

0

0

0

199

Describe any expected special needs population

Elderly housing

Is this your first green affordable housing project?

☐ Yes ☒ No

BUILDING INFORMATION ▼

BUILDING #1 ▶

CONSTRUCTION SCHEDULE ▶

DEVELOPMENT TEAM ▼

PROJECT SPONSOR
This is me:

First Name

Tina

Last Name

Miller

Organization

Cambridge Housing Authority

Title

Energy Consultant



ARCHITECT
This is me:

First Name	Ben	Last Name	Wilson
Organization	BH+A	Title	Architect
Phone Number		Email Address	bwilson@bhplus.com
Access Level		Active	<input checked="" type="checkbox"/>

GREEN BUILDING SPECIALIST
This is me:

First Name	Mike	Last Name	Schofield
Organization	Clearesult	Title	Senior Project Manager
Phone Number	(508) 365-3204	Email Address	mike.schofield@clearesult.com
Access Level		Active	<input checked="" type="checkbox"/>



[Green Certification Details](#)

[Green Portfolio Overview](#)

[Certification Map](#)

[Brandy Hill](#) ▼

The project has been certified!

Project Overview

PROJECT INFORMATION ▼

Project Name	Brandy Hill	Name of Co-Sponsor or JV Partner ⓘ	
Street Address ⓘ	105 Minot Road	Type of Project	Multi-Family ≤ 4 stories ▼
City	Wareham	Number of Buildings	11
State	MA ▼	Total Project Square Feet ⓘ	148438
Zip Code	02571	Total Lot Size (square feet) ⓘ	0



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UNITS

14

83

35

0

0

132

Describe any expected special needs population

None

Is this your first green affordable housing project?

☐ Yes ☒ No

BUILDING INFORMATION

BUILDING #1

BUILDING #2

BUILDING #3

BUILDING #4

BUILDING #5

BUILDING #6

BUILDING #7

BUILDING #8



CONSTRUCTION SCHEDULE ▶

DEVELOPMENT TEAM ▼

PROJECT SPONSOR
This is me:

First Name	Julie	Last Name	Klump
Organization	POAH	Title	Vice President
Phone Number		Email Address	jklump@poah.org
Access Level		Active	<input checked="" type="checkbox"/>

ARCHITECT
This is me:

First Name	Jason	Last Name	Grier
Organization	TAT	Title	Architect



GREEN BUILDING SPECIALIST
This is me:

First Name	Mike	Last Name	Schofield
Organization	Clearesult	Title	Senior Project Manager
Phone Number		Email Address	mike.schofield@clearesult.com
Access Level		Active	<input checked="" type="checkbox"/>

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The project has been certified!

Project Overview

PROJECT INFORMATION ▼

Project Name	Putnam Gardens	Name of Co-Sponsor or JV Partner ⓘ	
Street Address ⓘ	64 Magee Street	Type of Project	Multi-Family ≤ 4 stories ▼
City	Cambridge	Number of Buildings	3
State	MA ▼	Total Project Square Feet ⓘ	103221
Zip Code	02139	Total Lot Size (square feet) ⓘ	0



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UNITS

0

122

0

0

0

122

Describe any expected special needs population

Is this your first green affordable housing project?

☐ Yes ☒ No

BUILDING INFORMATION

BUILDING #1

BUILDING #2

BUILDING #3

CONSTRUCTION SCHEDULE

DEVELOPMENT TEAM

PROJECT SPONSOR
This is me:

First Name

Tina

Last Name

Miller



ARCHITECT

This is me:

First Name	Ben	Last Name	Wilson
Organization	BH+A	Title	Architect
Phone Number	(617) 350-0450	Email Address	bwilson@bhplus.com
Access Level		Active	<input checked="" type="checkbox"/>

GREEN BUILDING SPECIALIST

This is me:

First Name	Mike	Last Name	Schofield
Organization	Clearesult	Title	Senior Project Manager
Phone Number		Email Address	mike.schofield@clearesult.com



First Name	<input type="text" value="Ann"/>	Last Name	<input type="text" value="John"/>
Organization	<input type="text" value="CLEAResult"/>	Title	<input type="text"/>
Phone Number	<input type="text" value="(508) 948-3652"/>	Email Address	<input type="text" value="ann.john@clearesult.com"/>
Role	<input type="text"/>	Active	<input checked="" type="checkbox"/>
Access Level	<input type="text"/>	Primary	<input checked="" type="checkbox"/>

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