

LT Prerequisite: Floodplain Avoidance

The project is outside of the FEMA 100 year flood plain.

LT Credit: LEED for Neighborhood Development

Not applicable to project.

LT Credit: Site Selection **8 Points**

The project is located on a site that has been previously developed over more than 75% of its area (4 points). The project is an infill development where 75% of the land within ½ mile is previously developed (2 points). The project is within ½ mile of a community open space of at least ¾ acre, Foss Park (1 point). The project is in an area of high intersection density (1 point). The project provides both access to existing bicycle networks and on site bicycle storage per LEED requirements (1 point)

LT Credit: Compact Development **3 Points**

The project has a density of 180 dwelling units per acre.

LT Credit: Community Resources **2 Points**

The project is within a ½ mile radius of more than 12 of the listed community resources.

LT Credit: Access to Transit **1 Point (1 possible)**

The project is within a ¼ mile of bus stops. Pending further analysis, additional points may be available.

c. **Sustainable Sites (SS)**

SS Prerequisite: Construction Activity Pollution Prevention

The project will follow standard practices to control erosion and construction dust and debris.

SS Prerequisite: No Invasive Plants

The project will not include any invasive plants.

SS Credit: Heat Island Reduction **1 Point (1 possible)**

The project will have greater than 50% of hardscape area treated with an acceptable non-absorptive material. Additional point may be available pending further design development.

SS Credit: Rainwater Management **(2 Points possible)**

The project has an onsite stormwater retention and infiltration system designed to capture runoff from the building, in addition to permeable paving and planted areas with native or adapted plant material. Further design development is required to quantify permeable areas and to determine how much of a two-year, 24-hour storm event the sub-grade infiltration system is capable of handling. One or more points from this credit will be moved from “maybe” if it is later determined that the project can achieve more than the 50% minimum area that is permeable or can direct water to the on-site infiltration system.

d. **SS Credit: Non-Toxic Pest Control** **1 Point (1 possible)**

The project will provide a minimum 6” inspection space between landscape grade and non-masonry siding (1/2 point). The project will seal all exterior cracks/joints/penetrations as required (1/2 point). Additional point may be available pending further design development.

e. **Water Efficiency (WE)**

WE Prerequisite: Water Metering

The project will install a water meter as required.

WE Credit: Total Water Use

Not applicable to project.

WE Credit: Indoor Water Use 3 points (3 possible)

The project will provide lavatory faucets with a flow rate not exceeding 1.5 gpm (1 point). The project will provide showerhead fixtures with a flow rate not exceeding 1.75 gpm (1 point). The project will provide Energy Star rated clothes washers (1 point). Additional points may be available pending further design development.

WE Credit: Outdoor Water Use 4 Points

The project will utilize less than 5% of planted area as turf grass, and more than 75% of planted area as native or adapted plant area.

f. **Energy and Atmosphere (EA)**

EA Prerequisite: Minimum Energy Performance

The project will comply with the requirements of the prerequisite including whole building energy modeling and commissioning.

EA Prerequisite: Energy Metering

The project will provide electrical metering as required.

EA Prerequisite: Education of Tenant/Building Manager

Building Managers and tenants will be provide education on the operations and maintenance of the building as required.

EA Credit: Annual Energy Use 20 Points (5 possible)

By targeting PHIUS+ 2018 (with PHIUS+ Core for Net Source Energy) Certification, the project would be allowed to claim a 30% energy savings above ASHRAE 90.1-2010, based on LEED Interpretation ID#10486 - Passive House Cert for v4. A 30% savings translates to 20 points under Table 5 for the Annual Energy Use credit. Based on the small studio apartments, the project is eligible for additional points through the conditioned floor area reduction, listed conservatively as 5 possible points.

EA Credit: Efficient Hot Water Distribution 2 Points (2 possible)

The project will provide pipe insulation for all domestic hot water (2 points). Additional design development and detailing will be required to further ascertain the building's actual performance.

EA Credit: Advanced Utility Tracking (1 Possible)

The project will likely provide irrigation sub-metering for 1000 sf of landscape area.

g. **Materials and Resources (MR)**

MR Prerequisite: Certified Tropical Wood

The project will not utilize any tropical wood species.

MR Prerequisite: Durability Management

The project will be designed to meet all applicable indoor moisture control measures as outlined in the prerequisite.

MR Credit: Durability Management Verification 1 Point

The project will be inspected to ensure that durability management measures have been executed.

MR Credit: Environmentally Preferable Products 2 Points (2 possible)

The project will provide environmentally preferable products within Option 2 of the credit to achieve 2 points. This will include incorporating the minimum amount of supplementary cementitious material in concrete, and products with recycled content where possible. Additional design development will be required to ascertain the specifics and extent of individual products.

MR credit: Construction Waste Management 1 Point

The project will aim to achieve a 20% waste reduction per the requirements of the credit.

h. Indoor Environmental Quality (IAQ)

IAQ Prerequisite: Ventilation

The project will meet the requirements of the prerequisite by providing an ASHRAE compliant fresh air system for the entire building

IAQ Prerequisite: Combustion Venting

The project will meet the requirements of the prerequisite.

IAQ Prerequisite: Garage Pollutant Protection

The project will meet the requirements of the prerequisite.

IAQ Prerequisite: Radon Resistant Construction

The project will meet the requirements of the prerequisite.

IAQ Prerequisite: Air Filtering

The project will meet the requirements of the prerequisite.

IAQ Prerequisite: Environmental Tobacco Smoke

The project will meet the requirements of the prerequisite.

IAQ Prerequisite: Compartmentalization

The project will meet the requirements of the prerequisite.

IAQ Credit: Enhanced Ventilation 3 Points

The project will provide a balanced ventilation system for all dwelling units that meets the minimum requirements of ASHRAE 62.2-2010 (2 points) and continuous exhaust at bathrooms (1 point).

IAQ Credit: Contaminant Control 1 Point (1 possible)

The project will provide walk-off mats (.5 points), The project will conduct a Pre-occupancy flush (.5 points). Additional points may be available after further design and cost analysis.

IAQ Credit: Balancing of Heating and Cooling 1 Point

The project will perform supply air flow testing.

IAQ Credit: Enhanced Compartmentalization (2 possible)

The project may be eligible for additional points pending further design development.

IAQ Credit: Enhanced Combustion Venting 2 Points

The project will not install any fireplaces or woodstoves.

IAQ Credit: Enhanced garage Pollutant Protection 1 Point

The project will not include a garage.

IAQ Credit: Low Emitting Products 1 Point (2 possible)

The project aims to provide at least 2 of the required low emitting product categories (1/2 point each). Additional points may be available.

IAQ Credit: No Environmental Tobacco Smoke 1 Point

The project will prohibit smoking throughout the building.

i. **Innovation (IN)**

IN Prerequisite: Preliminary Rating

The project will hold a preliminary meeting as soon as feasible to assess LEED goals and procedures.

IN Credit: Innovation (2 possible)

The project will explore possible points under this credit as the design develops further.

j. **Regional Priority (RP)**

RP Credit: Regional Priority 2 points (2 possible)

The project will receive an RP credit for Annual Energy Use (1 point). The project will receive an RP credit for Access to Transit (1 point). The project may receive additional credits pending further design development.



LEED v4 for Building Design and Construction: Multifamily Midrise

Project Checklist

Project Name: 152 -158 Broadway

Date: Revised 1/25/2021

Y ? N

2			Credit	Integrative Process	2
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14 1 0 Location and Transportation 15

Y			Prereq	Floodplain Avoidance	Required
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PERFORMANCE PATH

			Credit	LEED for Neighborhood Development Location	15
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PRESCRIPTIVE PATH

8			Credit	Site Selection	8
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3			Credit	Compact Development	3
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2			Credit	Community Resources	2
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1	1		Credit	Access to Transit	2
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2 4 0 Sustainable Sites 7

Y			Prereq	Construction Activity Pollution Prevention	Required
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Y			Prereq	No Invasive Plants	Required
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1	1		Credit	Heat Island Reduction	2
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	2		Credit	Rainwater Management	3
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1	1		Credit	Non-Toxic Pest Control	2
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7 3 0 Water Efficiency 12

Y			Prereq	Water Metering	Required
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PERFORMANCE PATH

			Credit	Total Water Use	12
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PRESCRIPTIVE PATH

3	3		Credit	Indoor Water Use	6
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4			Credit	Outdoor Water Use	4
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22 8 0 Energy and Atmosphere 37

Y			Prereq	Minimum Energy Performance	Required
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Y			Prereq	Energy Metering	Required
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Y			Prereq	Education of the Homeowner, Tenant or Building Manager	Required
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20	5		Credit	Annual Energy Use	30
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2	2		Credit	Efficient Hot Water Distribution	5
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	1		Credit	Advanced Utility Tracking	2
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4 2 0 Materials and Resources 9

Y			Prereq	Certified Tropical Wood	Required
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Y			Prereq	Durability Management	Required
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1			Credit	Durability Management Verification	1
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2	2		Credit	Environmentally Preferable Products	5
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1			Credit	Construction Waste Management	3
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10 5 0 Indoor Environmental Quality 18

Y			Prereq	Ventilation	Required
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Y			Prereq	Combustion Venting	Required
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Y			Prereq	Garage Pollutant Protection	Required
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Y			Prereq	Radon-Resistant Construction	Required
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Y			Prereq	Air Filtering	Required
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Y			Prereq	Environmental Tobacco Smoke	Required
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Y			Prereq	Compartmentalization	Required
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3			Credit	Enhanced Ventilation	3
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1	1		Credit	Contaminant Control	2
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1			Credit	Balancing of Heating and Cooling Distribution Systems	3
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	2		Credit	Enhanced Compartmentalization	3
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2			Credit	Enhanced Combustion Venting	2
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1			Credit	Enhanced Garage Pollutant Protection	1
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1	2		Credit	Low Emitting Products	3
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1			Credit	No Environmental Tobacco Smoke	1
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0 2 0 Innovation 6

Y			Prereq	Preliminary Rating	Required
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	2		Credit	Innovation	5
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			Credit	LEED AP Homes	1
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2 2 0 Regional Priority 4

1			Credit	Regional Priority: Specific Credit	1
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1			Credit	Regional Priority: Specific Credit	1
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	1		Credit	Regional Priority: Specific Credit	1
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	1		Credit	Regional Priority: Specific Credit	1
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63 27 0 TOTALS Possible Points: 110

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

Net Zero Ready Application Narrative

The project is pursuing Passive House Certification through the Passive House Institute US (PHIUS). To the extent feasible, the project will aim for the PHIUS+ Core standard, which includes all of the PHIUS+ 2018 space conditioning targets, with a Net Source Energy target set at 5,500 kWh/person-yr. The non-residential ground floor portion of the building is proposed to be excluded from the Passive House Certification boundary. Jeff Geisinger will serve as the lead Certified Passive House Consultant (CPHC) for the project and will be an integral member of the team's sustainable design approach. Below is a description of how the project plans to incorporate the five Passive House design principles and how it will meet the commitment for no on-site combustion for HVAC and cooking equipment.

Continuous Insulation

The project will utilize continuous exterior insulation throughout the thermal envelope. While the exact make-up is under development, the team will consider two to three inches of continuous mineral wool outboard of the sheathing for the walls. The stud cavity will be filled with either dense-pack cellulose or blown-in fiberglass insulation. A critical component of the continuous insulation strategy will be the elimination of thermal bridging wherever feasible. For example, the project will evaluate thermally broken façade attachment clips such as the Knightwall MFI system and Cascadia Clip system to minimize heat loss. Insulation will be continuous at all transitions such as at parapets and soffits. This approach will keep heating loads to a minimum, and it will contribute to thermal comfort and durability of the building envelope.

Optimized Windows + Solar Gains

Careful window design will be a key feature of the building's Passive House approach. The project has a relatively low Window-to-Wall Ratio which will help control heat loss and gain. The windows will be high-performance triple-glazed, uPVC framed units with argon fill and low-e coatings, which will ensure low U-values compliant with the Passive House energy model. For the operable windows, the team will evaluate tilt/turn windows for their superior airtightness. The solar heat gain coefficient (SHGC) of the glazing will be carefully tuned to prevent overheating while maintaining some beneficial wintertime gains through the south-facing windows. Further, the team is currently studying cost-effective and aesthetically appropriate solar shading devices on south and west facing windows, to cut off higher altitude summer sun while allowing for passive gain in the colder months.

Airtight Construction

The project will pursue the Passive House airtightness target of 0.06 cfm50/sf-envelope. Successful air tightness begins with smart space and systems planning; the project will minimize penetrations in the airtight envelope through its utilization of all-electric (non-venting) heating systems and ventless dryers. Further, the project is studying centralized ventilation which will also greatly minimize the number of holes in the building façade. Next, the building envelope will feature a robust air barrier system. The team is evaluating a self-adhered, vapor open air and weather barrier system with integral tapes, which will allow for durable sealing at transitions such as windows, wall jogs, parapets, and soffits. Tilt/turn windows and air-sealed exterior doors will also enhance the airtightness of the building. Further, the

walls, ceilings, and floors of each dwelling unit will be carefully detailed to achieve excellent compartmentalization to limit the transfer of air and sound between units.

Balanced Ventilation with Heat Recovery

Balanced mechanical ventilation with energy recovery will ensure that filtered outdoor air can be delivered to all living spaces with minimal energy penalty. Fresh air will be delivered at living rooms and bedrooms, while stale air will be exhausted at bathrooms and kitchens. The team is evaluating a centralized energy recovery ventilator such as the Swegon Gold for its excellent sensible effectiveness and low fan power consumption, to help in meeting the Passive House standard. A centralized system will be easier to maintain and commission as compared to distributed individual ERV's.

Minimized Mechanical Systems

As the building's heating and cooling loads will be minimized due to the robust building envelope, the space conditioning systems will be right-sized to meet these smaller loads. The project will use air source heat pumps to deliver heating and cooling to the spaces, and the team is evaluating the pros and cons between a centralized VRF system and individual, "1:1" mini-split heat pumps. In either scenario, the system will have high efficiency at low outdoor temperatures. In addition to space conditioning, the building will take advantage of efficient lighting and will specify ENERGY STAR appliances. The team will consider heat pump dryers for increased efficiency. While the water heating system is under consideration, the project will utilize low-flow fixtures to minimize demand. Petersen Engineering, one of the leading mechanical engineering firms for multifamily Passive House in New England, will be designing the building's mechanical systems and will be key collaborators on the project.

No On-site Combustion for HVAC Systems and Cooking

As described above, the project's heating and cooling system will be all-electric air source heat pumps, and the ventilation system will also be all-electric. Cooking will be provided by either electric cooktops or electric induction, pending further study. Under consideration for the project's water heating system is a semi-central system of multiple heat pump water heaters (HPWH). This system is a highly efficient, all-electric solution; however, it would require careful study in terms of hot water distribution, recovery time, maintenance, and cost. The team will also study the viability of on-demand individual tankless electric water heaters, considering the impact on the building's electrical service and energy usage for Passive House. Also under consideration is a central gas-fired water heater system that would be planned for future conversion to a commercial heat pump when the technology is available. "Future ready" provisions will include locating the water heater in a penthouse or at the upper floor level, providing additional tank storage, and providing a chase for future refrigerant piping to a future outdoor heat pump. Lastly, the team is studying the feasibility of incorporating rooftop solar photovoltaics (PV) for generating on-site renewable energy to offset electrical consumption on the house meter.