

SUSTAINABLE & RESILIENT BUILDINGS QUESTIONNAIRE

Section 1: Proposal Information

Proposal Name	The Onyx
Address	16-20 Medford Street Somerville, MA
Developer	Somerville Living LLC
Business Address	PO Box 780, Lynnfield, MA 01940
Designated Contact	Paul DiBiase, Manager
Telephone Number	781-334-9899
Contact's Email Address	info@dibiasecompanies.com
Date Submitted	5/3/2023
Filing Type (Development review application, Building Permit, or CoA)	Development Review Application
Is this a revised Questionnaire?	YES
Is MEPA Approval Required?	Yes/No; Why? NO, thresholds not met.

Section 2: Building & Site Details

2.1 Building Information

Building Uses	Residential
Gross Floor Area	50,779
Expected Life of Building	150 yrs+
Expected Life of Building Systems: HVAC, electrical, boilers, plumbing, telecom, lighting, energy management.	Electric heating, cooling, ventilation, Domestic Hot Water (DHW), lighting
Type of Heating System(s)	TBD based on energy modeling. Electric heat pump.
Type of Cooling System(s)	TBD based on energy modeling. Electric heat pump.

2.2. Green Building

Green Building Professional(s): Name(s) and contact information	Jeffrey Rhodin, LEAN Green Building, 781-704-4789, jtr@leangb.com Nathan Bearse, Green Building Consulting, nbearse@sea.us.com
Professional Credentials: Green Building Program Certification(s)	HERS Rater, LEED Green Rater, PHIUS+ Rater
Building LEED Rating	Platinum target
Building LEED Point Score	80+

Will you pursue LEED certification through the USGBC?

Yes, LEED Platinum Certified.

Are any other green building certifications being pursued? (Passive House, Enterprise Green Communities, etc.). Please describe.

Yes, PHIUS Certified.

2.3. Electric Vehicle Parking

The number of electric vehicles (EVs) in Somerville is expected to increase significantly over the next decade with more electric vehicles coming to market than ever before. Conservative estimates based on historical trends alone suggest 20% of personal vehicles in Somerville will be electric by 2040. Installing capacity for EV supply equipment (EVSE) has been shown to be more feasible and cost effective during construction than when retrofitting parking areas to support the installation of EVSE in the future¹. Providing EVSE can increase the property value, become a future revenue source, and provide an amenity that more tenants and commuters will be looking for. It is recommended that parking facilities be designed to allow for the most flexibility to adapt to future needs of electric vehicles and changing mobility needs. The City of Somerville recommends 25% of spaces have installed charging access and up to 100% of spaces be “EV Ready” (everything but the station installed). Eversource currently has a program to pay the associated infrastructure costs of EV charging, including infrastructure needed to be “EV ready.” Please consult with Eversource to determine if any installation costs could be covered through their [Make Ready Program](#).

Total # of Parking Spaces
EVSE Plugs (number and voltage/level of plugs)
EV Ready Spaces (everything but station is installed)
Please share any other information on your EV strategy. Have you spoken with Eversource? Are you talking with EVSE providers? Have you considered EVSE needs in conjunction with your parking and mobility management plans?

12 total parking spaces on site.

11 parking spaces equipped with Level 2 chargers.

N/A

Submitted electrical work order paperwork with Eversource to include all 11 units with level 2 chargers in operation.

Level 2 chargers planned for 208-240 volt, 40 amp circuits.

¹ <http://evchargingpros.com/wp-content/uploads/2017/04/City-of-SF-PEV-Infrastructure-Cost-Effectiveness-Report-2016.pdf>;
https://www.richmond.ca/shared/assets/Residential_EV_Charging_Local_Government_Guide51732.pdf

2.4 Key Building Efficiency Metrics

The following should be provided for each building type (office, retail, multifamily, hotel, restaurant, etc.).

Vertical Envelope Performance

*this project will not use ASHRAE 90.1 whole-building modeling. Ekotrope v4.0.2 hourly simulations will be run for each unit.

Vertical Envelope	*ASHRAE Reference Building			Proposed Building		
	Percent of Vertical Area	R value (see note 1)	U value (see note 2)	Percent of Vertical Area	R value (see note 1)	U value (note 2)
Framed, insulated Wall		R27+R1c.i.	U-value	75% (estimate)	R32 + 10c.i 22 cavity.	
Opaque glass, curtain wall, shadowbox, spandrel	NA – ASHRAE reference building has no spandrel			N/A	N/A	N/A
Vision glass	%	R-value	U-value (note 3)	25% (estimate)		U=.121, SHGC=.364 (proposed)
	100%		Aggregate U (note 4)	N/A		N/A
			Aggregate R			N/A

Notes:

1. Show in format of R+R c.i. where first R is amount of discontinuous insulation and second R is amount of continuous insulation.
2. U values shall be based on indicated R+R c.i. and shall conform to Appendix A of ASHRAE 90.1 2013.
3. U value includes frame, per NRFC standard methods.
4. Aggregate U is calculated as: $(U_1\%_1 + U_2\%_2 + U_3\%_3)$ where U is the respective thermal transmittance values and $\%_1$ is the percent area of framed insulated wall; $\%_2$ is the percent area of opaque glass, curtain, or shadowbox; and $\%_3$ is the percent area of vision glass. Only areas adjacent to conditioned space are counted, areas adjacent to unconditioned spaces (e.g. parking garages, mechanical penthouses) are not counted. Aggregate R is the inverse of aggregate U. For percent areas for ASHRAE reference building, see Table G3.1.1-1 in ASHRAE 90.1 2013.

Other Performance Metrics

	ASHRAE Reference Building	Proposed Building
Air Infiltration (ACH 50)		3.0 ACH50 (each unit)
Aggregate Vertical Envelope R		R32
Roof R		R-49
Lowest level conditioned floor above unconditioned space (if any) R		R-30
Cooling End Use (kBtu/sf-yr)		TBD through unit energy model
Heating End Use (kBtu/sf-yr)		TBD through unit energy model
Peak Heating (kBtu/hr-sf)		TBD through unit energy model
Peak Cooling (kBtu/hr-sf)		TBD through unit energy model
Site EUI (kBtu/hr-sf)		

Section 3. Planning for Net Zero Emissions and Energy Resilience

3.1. How is the building currently designed to reduce energy usage? Please describe the key design features of the building including:

- A) Building envelope performance (including roof, foundation, walls, and window assemblies)
- B) How has the design team integrated energy performance into the building and site design and engineering (orientation, massing, mechanical systems, envelope, etc.)?
- C) Efficiency of heating and cooling systems. Will these systems be electric? Provide reasoning for selection of heating and cooling systems.

PHIUS and LEED Platinum standards. Better than code required insulation levels, high performance HVAC, high performance windows, ENERGY STAR Qualified roofing materials will be used for at least 75% of the roof, dense unit count.

3.2 Will the building be a net zero carbon building? A net zero carbon building is a highly energy efficient building that does not burn fossil fuels and either produces or procures enough carbon-free electricity to meet

the building's total energy demand. If the building will not be a net zero carbon building, provide a technical description of how the building's systems will be transitioned over time to achieve net zero carbon emissions, including how and when systems can be transitioned in the future to carbon-free alternatives (provide timeline including 2030, 2040, and 2050 targets). Description must include whether any remaining emissions will be offset with on-site or off-site renewables and at what quantity. Changes could include, but are not limited to, addition of on-site renewable energy generation, energy storage, additional energy efficiency measures, building electrification, or other measures that would further reduce greenhouse gas emissions.

PHIUS and LEED Platinum standards. High-performance envelope, high performance windows, ENERGY STAR Qualified roofing materials will be used for at least 75% of the roof, electric systems.

3.3 Describe any and all incentives, rebates, grants provided by utilities, government organizations, and other organizations being pursued to maximize building efficiency and to reduce emissions. Description must include any incentives that were considered but are not being pursued, including reasoning for each decision.

Discussion with MassSave is ongoing to leverage utility company incentives for high performance systems including but not limited to PHIUS and LEED Platinum.

3.4 Evaluate feasibility of on-site renewable generation. Please describe your analysis and findings. Analysis should consider incentives available. Will any renewable energy generation be incorporated into the project? If so, please describe (system type and capacity). If no, could it be added in the future? And will any off-site renewable energy be purchased?

The design includes Green Roofs and roof decks, and we're looking at provisioning for future solar technology to be added at a later date.

3.5. Are any on-site energy storage systems planned? Please describe.

None are planned at this time.

3.6 Does the electric utility's infrastructure have enough capacity to support the addition of your building's energy load? Please provide confirmation from utility.

Yes. Current work order completed with Eversource.

3.7 Will the building's roof include any sustainability features? These may include, but are not limited to, high albedo roof materials, solar panels, or vegetation. Please describe what features could be added in the future (i.e. roof will be designed to support solar or green roof installation of X size).

Roof will be high-albedo material such as white, and include a green roof with vegetation.

Section 4: Climate Change Risk and Vulnerability

4.1 Climate Vulnerability

Exposure

(check all that apply)

- ☐ Sea Level Rise & Storm Surge
- ☐ Precipitation Induced Flooding
- ☐ Heat
- ☐ Other(s):

4.2 How is your site vulnerable to projected climate change impacts?

Little impact from flooding due to high elevation, cooling strategies include green roof and reflective roofing materials.

The next two sections ask specific questions about how the project is designed to manage climate-related risks from heat, coastal and inland flooding.

Section 5: Managing Heat Risks

5.1 Describe all building features that will keep building occupants safe and comfortable during extreme heat, including mechanical systems and non-mechanical design elements to cool building (orientation, envelope, operable windows, etc.).

PHIUS and LEED Platinum standards. Operable windows, air-tight construction, qualified subcontractors, high-performance insulation and construction.

5.2 How has increased demand for indoor cooling been factored into the building design and energy management strategy?

This high-performance building will have very low unit cooling loads and will be able to remain comfortable during high-heat events.

5.3 List any indoor spaces without cooling and their uses.

Parking garage will be without cooling. Commercial space is also excluded until a tenant occupies the space.

5.4 What design features will be implemented on site to minimize the site's contribution to the urban heat island effect? Please describe any and all design elements. Strategies could include, but are not be limited to, the following:

- High albedo pavement or roof materials
- Passive cooling or increased ventilation capacity
- Green roofs or walls
- Heat resistant trees and plants
- Additional landscaped areas

Landscaped areas around building. Majority of plants/trees selected for the site's landscaping strategy are considered native and drought resistant.

Section 6: Managing Flood Risks

6.1 Is the site susceptible to flooding from sea level rise and storm surge and/or rain events now or during the building's expected lifetime? Please refer to the Somerville Climate Change Vulnerability Assessment and the updated stormwater flooding maps provided in the Background section of this Questionnaire. Additional maps and data are available by request (email hpayne@somervillema.gov)

NO

If you answered YES to the previous question, please complete the remainder of Section 6. Otherwise, you have completed the Questionnaire. Thank you.

6.2 Flooding Design Considerations

Proposed Site Elevation - Low	(ft)	Proposed Site Elevation - High	(ft)
Lowest elevation of life-safety systems	(ft)	Proposed First Floor Elevation	(ft)
Nearest flood elevation for the 2070 10-year storm		Nearest flood elevation for the 2070 100-year storm	

6.3 What are the first floor uses of the building? Are there any below ground stories of the building? If so, what uses are located below ground?

6.4 Are there any flood-sensitive assets, utilities, mechanical equipment, or life-safety systems located in areas of the building that are at risk of flooding? What measures will protect building systems during a flood or severe storm? These might include, but may not be limited to, the following:

- Elevation of utilities and mechanical systems
- Water tight utility conduits
- Waste water back flow prevention
- Storm water back flow prevention
- Systems located above the ground floor
- Securing objects at risk of becoming dislodged

6.5. Residential and commercial buildings should be designed to maintain regular operations during a 10-year storm in 2070. Describe how the site and building have been designed to maintain regular operations--meaning all systems will remain operational and all occupied spaces are protected from flooding--during the 2070 10-year storm. Please refer to both the 2070 coastal flood probability map and the 2070 10-

year storm and 1-year sea level rise scenario (pages 3 and 6). Resilience measures might include, but may not be limited to, the following:

- Elevation of the site
- Structural elevation of the building
- Non-structural elevation of the ground floor
- Energy storage and backup generation
- Wet flood-proofing (allowing water to flow through building envelope)
- Dry flood-proofing (preventing water from entering building)

6.6 Residential buildings should be designed to allow occupants to shelter in place during a catastrophic storm (100-year event) today and in the future, this means all life-safety systems should be above the 2070 100-year flood elevation. **How will your site and building be impacted by the 2070 100-year, 24-hour storm and how will your site and building be designed to protect against those impacts?** Please evaluate impact based on both the 2070 coastal flood depth model for the 100-year storm and the 2070 100-year, 100-year sea level rise model (pages 4 and 7). Summarize anticipated pre- and post-event policies, strategies, and actions necessary to facilitate post-flood recovery.

6.7 Will hazardous or toxic material be stored on site? Where will it be stored? How will you protect hazardous or toxic material from flooding?

6.8 Will the site be accessible by a typical vehicle during a 10-year event (up to 6 inches of water) and by emergency vehicles (up to 12 inches of water) during a 100-year event?