FORM: CRM (December 21, 2020)
Discontinue Prior Editions

CITY OF SOMERVILLE

Inspectional Services • Planning Board • Zoning Board of Appeals

CERTIFICATE OF RECEIPT OF REQUIRED MATERIALS BY CITY OF SOMERVILLE DEPARTMENT OF SUSTAINABILITY & ENVIRONMENT

Development Site Address:	44 Broadway
Applicant Name:	Highland Development with Philip Sima, Balance Architects

As required by the City of Somerville's Development Review Submittal Requirements, I certify that I have received and approved the following development review materials for the development proposal identified above:

☑ Sustainable & Resilient Building Questionnaire

☐ Net-Zero Ready Building: PHIUS+
- Building Resilience & Sustainability Narrative
- Copy of signed PHIUS+ Certification Contract
- Copy of signed PHIUS+ Certification Fee Receipt

☐ Net-Zero Ready Building: Zero Carbon
- Building Resilience & Sustainability Narrative
- Evidence of ILFI Premium Membership
- Evidence of ILFI New Zero Carbon Project Registration

☑ LEED Certifiability
- LEED Gold or Platinum checklist
- LEED Narrative
- Signed affidavit by LEED accredited professional

Signature: _____ Date: 4/13/21

Sustainability & Environment Representative

LINNEAN SOLUTIONS

SUSTAINABILITY NARRATIVE

44 Broadway, SOMERVILLE MA

LINNEAN SOLUTIONS

LEED for Homes v4 – Sustainability Narrative

March 29, 2021

Project: 44 Broadway, Somerville, MA

Project Description:
44 Broadway, in Somerville, Massachusetts consists of one mixed use building containing 91 dwelling units. The project has been designed to meet a minimum of Platinum "Certifiable" level under the LEED for Homes- Midrise v4 program. The project is currently targeting 93.5 Points based on the attached checklist. Below outlines the list of strategies to meet these requirements.

Sincerely,

Ian Johnson
LEED AP HOMES/BD+C, WELL AP, CPHC
Senior Director
Linnean Solutions

SUSTAINABILITY STRATEGIES FOR LEED CREDITS

44 Broadway is fulfilling all prerequisites for all categories, in addition to the listed optional LEED credits.

Integrative Process

IP Credit: Integrative Process (2 pts)
An integrative project team, consisting of an architect civil engineer, landscape architect and Mechanical engineer, will participate in at least three phases of the design and construction process. The team will hold monthly meetings throughout the design process to review project status, introduce new team members to goals, discuss problems, formulate solutions, review responsibilities, and identify next steps.

The team will also participate in a design charrette (either 1 full day or 2 ½ day sessions) no later than design development and participate in at least 8 hours of trades training on the green aspects of the project. This will help to foster a deeper understanding of the project's sustainability goals and help to identify ways that each trade can contribute to the project.

Location & Transportation

LT Pre-requisite: Floodplain Avoidance Development (required)
The project is not located on land within a flood hazard area and therefore complies.

LT Credit: LEED for Neighborhood Development (15 pts)
The team is not pursuing this path.

LT Credit: Site Selection (8/8 pts)
The project complies with the following criteria for a total of 8 points as well as an additional Exemplary Performance point.

- Located on a previously developed site
- Is adjacent to land that is at least 75% developed
- Located within ½ mile of open space that is at least ¾ acre
- Meets the requirement of an open street network with at least 90 intersections within 1 square mile
- Located on a bicycle network
- Includes 91 indoor bicycle storage spaces
- Complies with the minimum requirements for bicycle storage spaces (short term and long term)

LT Credit: Community Resources (2/2 pts)
The project is located in an area with more than 20 community resources in a ½ mile walking distance. An exemplary performance credit may also be possible based on the credit requirements.

LT Credit: Access to Transit (2/2 pts)
The project is located within ½ mile walking distance of Sullivan Square passenger rail station as well as within ¼ mile walking distance to numerous bus stops that provide weekday and weekend services using buses # 89, #93, #90, #95 and #101.

Sustainable Sites

SS Prerequisite: Construction Activity Pollution Prevention (Required)

During construction, contractors will setup up hay bale swales, erosion blankets, sandbags and use stormwater filters to minimize erosion and water contamination from the site as much as possible.

SS Prerequisite: No Invasive Plants (Required)

No invasive plant species will be introduced to the landscape.

SS Credit: Heat Island Reduction (2/2 pts)

The project will use a variety of methods to reduce heat island effect including:

- Shading hardscape areas (estimated 15% or hardscapes will be shaded within 10 years of planting)
- Using non-absorptive materials
    - A white roof membrane will be used
    - Paving materials with a 3-year aged SRI of at least .28 or initial SRI of at least .33

SS Credit: Rainwater Management (3/3 pts)

A civil engineer will be working with the design team to incorporate various options for collecting and storing or diverting stormwater on the site such as rainwater harvesting for on-site irrigation.

SS Credit: Nontoxic Pest Control (2/2 pts)

The following strategies will be implemented as pest control measures

- Install a steel mesh barrier termite control system
- Install a physical termite barrier
- Use solid concrete foundation walls
- Design a minimum of 6" inspection space between the surface of the planned landscape grade and any non-masonry siding

Water Efficiency

WE Prerequisite: Water Metering (Required)

The project will include meters or submeters for each unit.

WE Credit: Indoor Water Use (6/6)

Specified plumbing fixtures will target a water use reduction. This means using all EPA Water Sense labeled fixtures and fittings.

Requirements:

Lav Faucets: 0.5 gpm
Kitchen Faucets: 1.5 gpm
Showers: 1.5 gpm
Toilets: 1.1 gpf or less
Clothes Washer: ENERGY STAR or equivalent

WE Credit: Outdoor Water Use (4/4 pts)

The project will not use turf grass and incorporate only native or adaptive plant species in the landscape.

Energy & Atmosphere

EA Prerequisite: Minimum Energy Performance (Required)

1. An energy modeler will create a baseline model to compare to a proposed energy model to support compliance with HERS modeling.
2. Each unit will also include an ENERGY STAR rated refrigerator, dishwasher or clothes washer.
3. All duct runs will be fully ducted.

EA Prerequisite: Energy Metering (Required)

Electric and gas submeters will be installed at each residential unit.

EA Credit: Annual Energy Use (28/29 pts)

In order to achieve this high level of energy performance the project will implement the following strategies:

- Hot water distribution circulating pump that is either on a timer or operated by a switch
- Pipe insulation with a minimum of R-4
- Incorporate a photovoltaic-ready design (design for future solar panels)
- Create an air-tight envelope with air leakage of exterior and demising walls of .35 cfm50/sf or better
- Windows with a U-value of .42 and SHGC of .35
- Install heat pump mini splits with an average annual COP of apx 2.85 or higher (based on Mitzubishi MSZ/MUZ-FE09)
- All ductwork to be located within a conditioned space and insulated
- Use an ENERGY STAR rated domestic hot water heater
- Interior lighting to be LED and be a reduction from the ENERGY STAR baseline (.6W/sf)
- Exterior lights to be LED
- ENERGY STAR rated appliances where applicable
- Target envelope insulation:
    - Roof= R30 or higher
    - Foundation=R20
    - Walls=R-13+R-3.8c.i. or higher

EA Credit: Hot Water Distribution (2/5 pts)

All hot water pipes will be insulated with a minimum of R-4 insulation.

EA Credit: Advanced Utility Tracking (1/2 pts)

The project will include individual utility meters and at least 50% of owners/ occupants will share their utility data with USGC or a USGBC-approved third party.

Materials & Resources

MR Prerequisite: Certified Tropical Wood (Required)

All of the wood used in the project will be non-tropical, FSC certified, reused or reclaimed or USGBC equivalent.

MR Prerequisite: Durability Management (Required)

To promote durability and performance of the building enclosure and components the following strategies will be implemented:

- Non-paper faced backing will be used in wet or high moisture areas such as at bathtubs, showers and behind fiberglass enclosures where wallboard is installed.
- Water-resistant flooring is to be used in kitchens bathroom and in entryways within 3ft of exterior doors
- A drain, drain pan and automatic shut off or flow restrictors or floor sloped to floor drain are to be installed for clothes washers over living spaces.
- Clothes dryers are to be vented directly to the exterior

MR Credit: Durability Management Verification (1/1 pt)
Each measure in the ENERGY STAR for homes v3 water management systems builder checklist is to be verified by the verification team.

MR Credit: Environmentally Preferrable Products (0/5 pt)
The project team will not be pursuing this credit.

MR Credit: Construction Waste Management (2/3 pts)
The project plans to divert waste generated on the construction site from landfills and/or incinerators by confirming the percentage the waste hauler is recycling and/or reusing. A 'construction waste management plan' (CWMP) will indicate alternative methods of disposal and tracking of waste and recycled and reused materials. "Dynamic Waste" is a well know hauler that is well versed in the LEED requirements.

Indoor Environmental Quality

EQ Prerequisite: Ventilation (Required)
- Local exhaust systems will be designed to be compliant with the requirements of ASHRAE 62.2-2010 (or local equivalent)
- Local exhaust systems exhaust directly to the outdoors
- All bathroom exhaust fans are ENERGY STAR-labeled or and HRV/ERV is used
- The project has installed MERV11 or higher filters
- The project is located in a nonattainment for ozone

EQ Prerequisite: Combustion Venting (Required)
The project will target the EPA Indoor airPLUS label which will satisfy the requirements.
If natural gas or other combustible fuel sources will be used ensure that:
- No unvented combustible appliances will be installed
- Carbon Monoxide monitors are to be hard-wired installed (with back up battery) at each floor
- If space and/or water heating devices use combustible fuel sources, one of the following requirements must be met
    - Equipment is installed with closed combustion
    - Equipment is installed with power-vented exhaust
    - Equipment is located in a detached utility building or open-air facility

EQ Prerequisite: Garage Pollution Protection (Required)
The project will target the EPA indoor airPLUS label and all penetrations and connecting floor/ ceiling joist bays will be sealed.

EQ Prerequisite: Radon Resistant Construction (Required)
The project will target the EPA Indoor airPLUS label which will satisfy the requirements.
The project is located within radon zone 1 and will need to comply with one of the following:
- Capillary breaks are installed according to specification 1.2 by installing polyethelene sheeting or extruded polystyrene insulation beneath the slab

- An electrical outlet will be provided near vent piping to accommodate future fan installation
- A gas-tight vertical vent pipe will be installed, extending through the conditioned space terminating above the roof

EQ Prerequisite: Air Filtering (Required)
The project will target the EPA Indoor airPLUS label which will satisfy the requirements. Use MERV8 (or higher) rated filters on recirculating space conditioning systems and MERV6 filters on mechanically supplied outdoor sir systems 10ft or more of ductwork.

EQ Prerequisite: Environmental Tobacco Smoke Control (Required)
Smoking will be prohibited in all common areas of the building and within 25 ft of all entrances and openings. Signage will indicate that a smoking policy has been implemented.

EQ Pre-requisite: Compartmentalization (Required)
Each unit will have sealed penetrations through walls, ceilings, floors and vertical chases. Weather stripping will be used at all dwelling unit entry doors leading to a common hallway as well as all exterior doors and windows. We recommend targeting an air leakage of no greater than .06 cfm50/sf.

EQ Credit: Enhanced Ventilation (3/3 pts)
An enhanced whole-house ventilation system will be designed and installed within each dwelling unit that meets the requirements of ASHRAE 62.2-2010 and does not exceed the requirements by more than 10%. Bathroom fans with an occupancy sensor may also be used in every bathroom with a bathtub or shower.

EQ Credit: Contaminant Control (2/2 pts)
Permanent walk-off mats at least 10ft in length in common areas will be installed at all primary entrances to reduce indoor pollutants. Additionally, designated shoe removal area (no conventional carpet may be used here) and storage may be incorporated near the main unit entries. A traditional preoccupancy flush out may be performed, however is not necessary if the building achieves the EPA Indoor airPLUS label. Final air testing may be performed to ensure that maximum levels of air contaminant concentrations were not exceeded.

EQ Credit: Balancing of Heating and Cooling Systems (2/3 pts)
To achieve high performance the project will target a balancing heating and cooling systems. This may be done by installing multiple forced air system zones in each unit, installing multiple/ room-by-room thermostatic controls, supply air flow rates within 25cfm of calculated values, balancing the pressure of bedrooms with the rest of the main dwelling unit.

EQ Credit: Enhanced Compartmentalization (1/1 pts)
The project will target a maximum air leakage of .06 cfm50/sf which exceeds the requirements of this credit.

EQ Credit: Combustion Venting (2/2 pts)
No fireplaces or woodstoves will be used in the project.

EQ Credit: Enhanced Garage Pollutant Protection (1/1 pts)
The project will meet the ASHREA 62.1-2010 requirements for garage ventilation and will have sufficient exhaust to create negative pressure with respect to adjacent spaces (with doors closed) including a continuously run exhaust fan. Self-closing doors and deck-to-deck partitions will also be installed.

EQ Credit: Low Emitting Products (3/3 pts)
Products used in the project such as paint, flooring, insulation, site-applied sealants and adhesives, and composite woods will meet the requirements of CA Section 01350.

EQ Credit: No Environmental Tobacco Smoke (1/1 pt)
The building intends to implement a no smoking policy throughout the building and in units which will be communicated to tenants in a written agreement.

Innovation

IN Credit: Innovation (5/5 pts)
The project is targeting the following credits:

1. Exemplary Performance – Site Selection
2. Exemplary Performance – Reduced Parking
3. Innovation- Housing Type- Affordability
4. Pilot- Integrative Health Promotion. The design team is working with Tufts Medical Center to establish high quality air filtration and reduce particulates in the residences by designing the ventilation system around the findings and recommendations by the Tufts team. Since the project is located adjacent to a major roadway, fine particulate contamination is a high concern for overall health of the building occupants.
5. Pilot- Assessment and Planning for Resilience

Regional Priority

RP Credit: Regional Priority- Specific Credit (4/4 pts)
Based on the project's zip code 02143, the building is eligible for certain regional priority credits.

- Annual Energy Usage (15-point threshold)
- Rainwater Management (3-point threshold)
- Access to Transit (1 point threshold)
- Non-Toxic Pest Control (2-point threshold)

INTRODUCTION

This document outlines Development Review Application requirements in relation to the long-term environmental sustainability and climate resilience of buildings within Somerville. Development proposals that require Site Plan Approval by the Somerville Zoning Ordinance must include a completed Sustainable & Resilient Buildings Questionnaire (Questionnaire) with the required Development Review Application. A Development Review Application is considered incomplete unless a completed questionnaire is submitted with the application. It is strongly recommended that the development team meets with staff from the Office of Sustainability and Environment prior to submitting the Development Review Application.

The purpose of this Questionnaire is to minimize the adverse environmental impacts in the design, construction, and occupancy of buildings in Somerville and to ensure that the impacts of future climate conditions are carefully evaluated.

Please review the following documents before completing the Questionnaire:

- **Somerville Climate Change Vulnerability Assessment**
- **Carbon Neutrality Pathway Assessment**
- **Somerville Climate Forward**

PROCEDURE:

A completed Sustainable & Resilient Buildings Questionnaire must be submitted with a Development Review Application for all development proposals that require Site Plan Approval. New construction or alterations to existing structures of 25,000 square feet or more must also submit an updated Questionnaire prior to the issuance of the first Building Permit and prior to the issuance of the first Certificate of Occupancy to identify any design changes made subsequent to Site Plan Approval or additional information determined as the development process unfolds.

BACKGROUND: CARBON NEUTRALITY

Understanding the global imperative to reduce greenhouse gas emissions in order to prevent extreme changes to the climate, Mayor Joseph A. Curtatone set a goal for Somerville to become carbon neutral by the year 2050. Carbon neutrality is defined as the net-zero release of carbon dioxide and other greenhouse gases (GHG) within Somerville's municipal boundary. Reducing greenhouse gas emissions is critical to avoiding the worst impacts of climate change and to protecting the health, safety, and welfare of current and future generations. In 2017, the Somerville Board of Aldermen passed a resolution reaffirming the city's carbon neutrality goal. And In 2018, Somerville released its first community-wide climate action plan, Somerville Climate Forward.

To achieve carbon neutrality by 2050 and to minimize adverse environmental impacts, Somerville will need to drastically reduce greenhouse gas emissions from electricity, buildings, transportation, and waste disposal. To meet these goals, all buildings within the city will need to pursue net zero emissions. New development should be designed to maximize envelope performance and energy efficiency, produce or procure renewable energy, and phase out fossil fuel use through electrification of building systems. The City of Somerville recognizes that as technology advances, incorporating design elements to mitigate carbon emissions and increase resilience may become more feasible. Applicants are asked to devise strategies that permit building systems to adapt and evolve over time to further reduce GHG emissions and to avoid path dependency that perpetuates reliance on fossil fuels.

BACKGROUND: CLIMATE CHANGE VULNERABILITY

Despite efforts to minimize greenhouse gas emissions, climate change is already impacting Somerville and changes to the climate will continue to intensify. The City of Somerville's Climate Change Vulnerability Assessment analyses vulnerabilities associated with Somerville's key climate stressors: increased precipitation, sea level rise and storm surge, and higher temperatures. The analysis recommends that new development consider these climate impacts and take appropriate measures to address the projected climatic conditions described in the assessment.

Several areas of Somerville are already prone to flooding from intense precipitation. With climate change, precipitation events will become more intense—meaning that a greater volume of rain will fall in a shorter period of time. Somerville is projected to experience more than a 30% increase in rainfall during a 100-year 24-hour event. This increase in precipitation will increase the risk of flooding in areas where the drainage system does not have sufficient capacity.

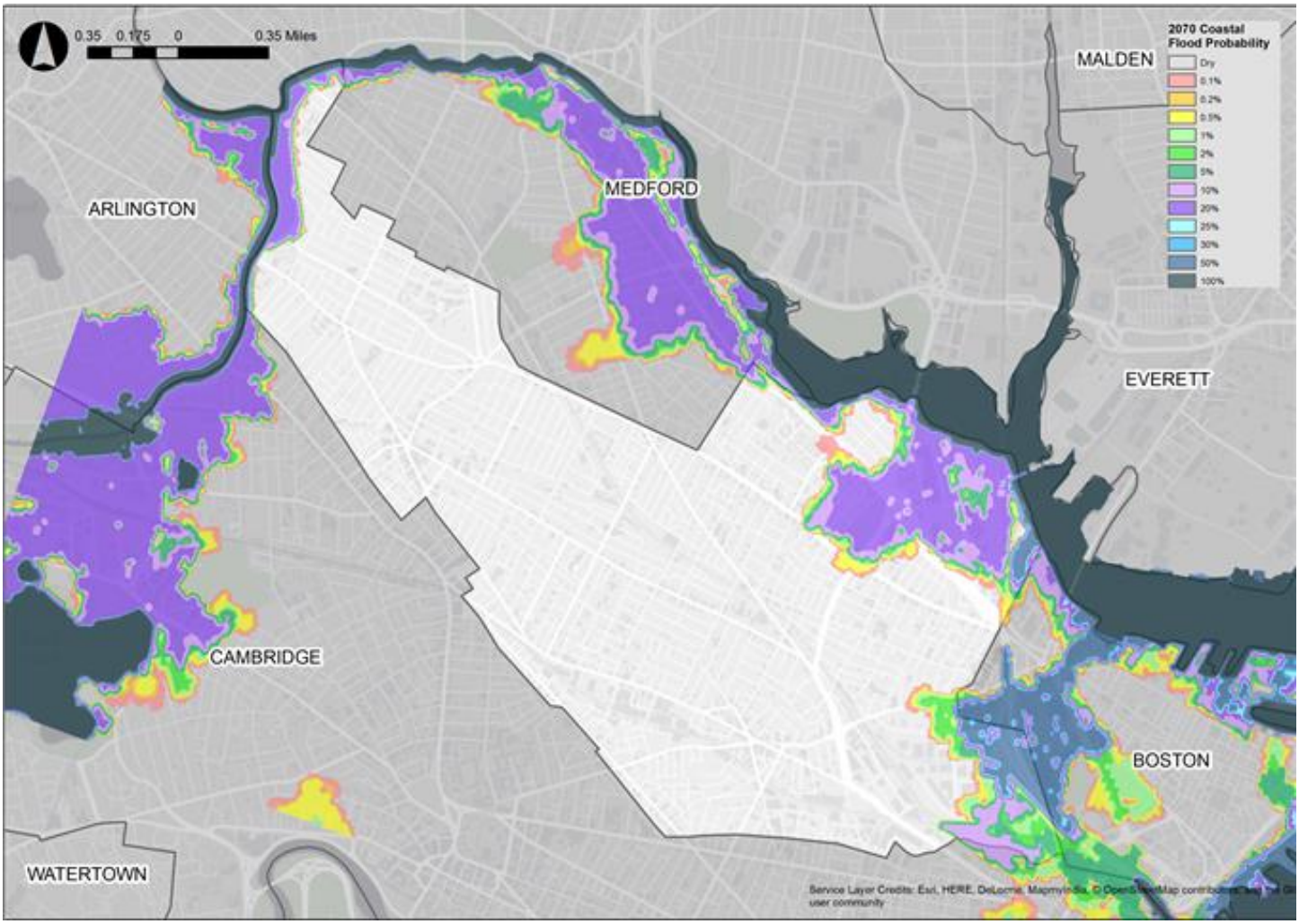
In addition to flooding from precipitation, sea level rise and storm surge are already potential concerns for areas of East Somerville and by 2035-2040 the Amelia Earhart Dam could be regularly flanked by storms, resulting in flooding for areas of Assembly Square, Ten Hills, and Winter Hill.

As the climate continues to change, average seasonal temperatures are also expected to increase and the number of days above 90 degrees Fahrenheit (historically about 10 a year) could rise to 40 days by 2030, a third of the summer, and 90 days by 2070, nearly the entire summer. In 2018 there were 23 days over 90 degrees.
As temperatures increase, Somerville will become more susceptible to the urban heat island effect which causes hotter temperatures due to paved surfaces and waste heat generated by energy use when compared to less developed areas. Increasing average temperatures can have wide-ranging impacts on human life, the built environment, and natural ecosystems. Rising temperatures and more intense heat waves present significant public health concerns and can contribute toward kidney, lung,

and heart problems. Vulnerable populations are particularly susceptible to heat-induced illness and mortality. There will also be increasing demand for indoor cooling.

The following maps and figures provide an overview of projected climate exposure. Please review the Climate Change Vulnerability Assessment for more detailed analysis on Somerville's exposure, vulnerability, and risk to climate change. For higher resolution maps and GIS files, please contact Hannah Payne, Sustainability Coordinator, at hpayne@somervillema.gov.

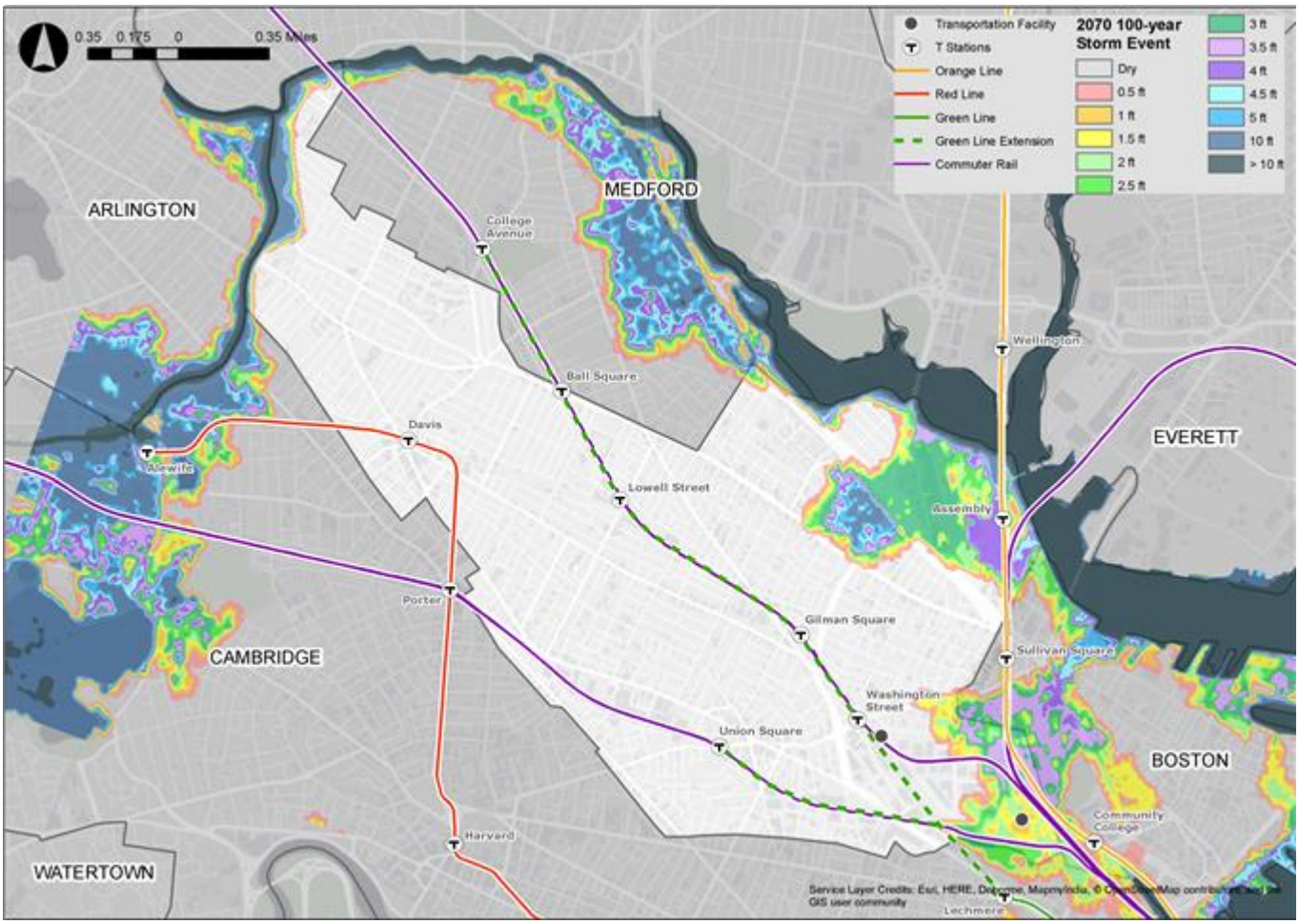
2070 Coastal Flood Probability



This map shows the annual chance of flooding from coastal storm events and sea level rise in 2070. A 100% chance of flooding means that there is a nearly certain chance that the area will flood at

least once in a given year, while a 50% chance means that there is an equal chance that it may or may not flood in a given year. A 1% chance of flooding corresponds with a 100-year event. A 0.1% chance corresponds with a 1000-year event. This map does not account for drainage (Somerville Climate Change Vulnerability Assessment, 2017)

2070 Coastal Flood Depth from 2070 100-year Storm Event

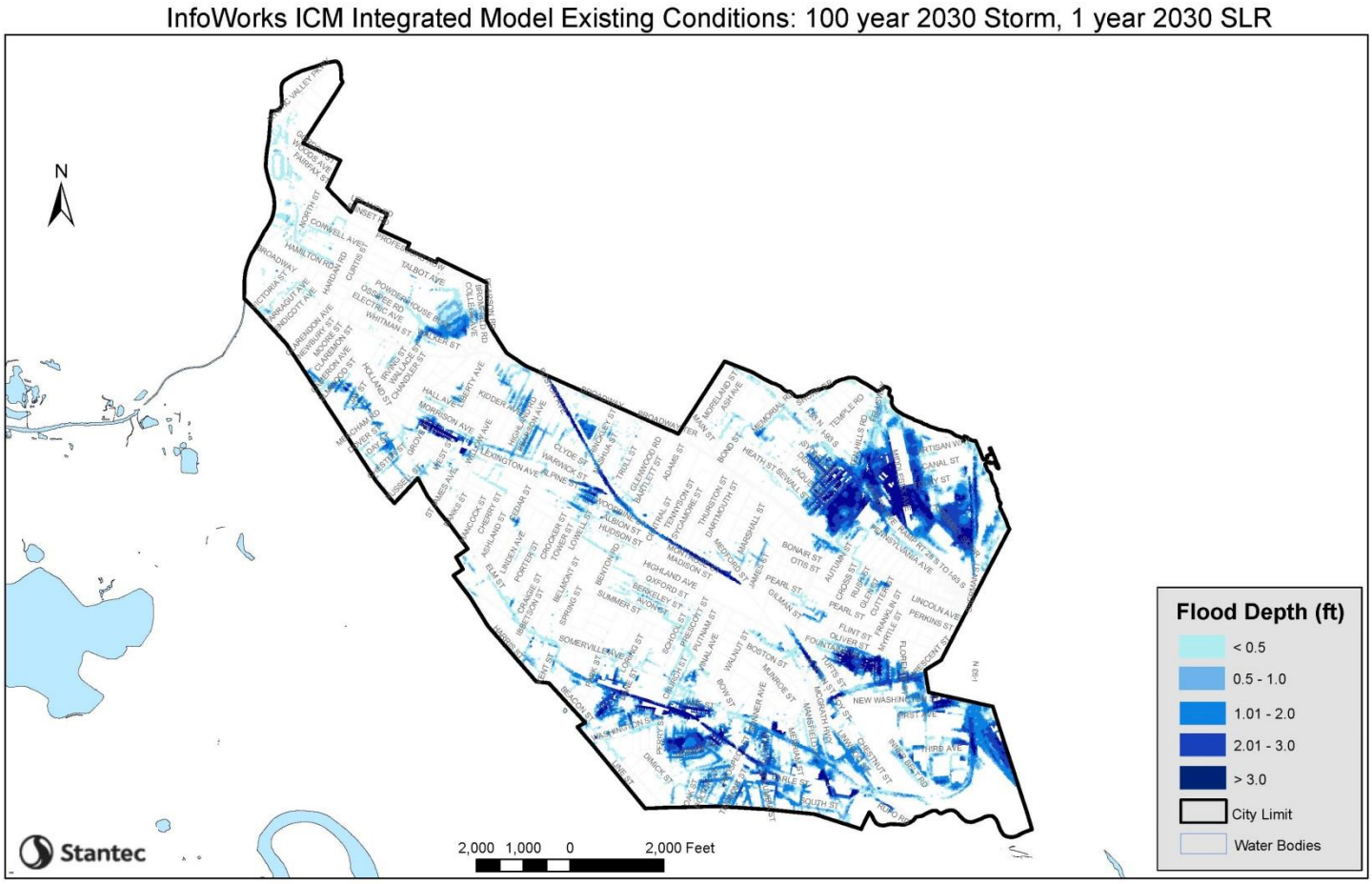


This map shows the projected flood depths of a 100-year coastal storm event in 2070 along with public transportation infrastructure assets. This map does not account for drainage (Somerville Climate Change Vulnerability Assessment, 2017)

Precipitation Projections

Precipitation-based flooding is projected to increase in Somerville and is currently more of an immediate and widespread threat than sea level rise and storm surge. The intensification of both the frequency and intensity of rainfall events is likely to cause increased risk of flooding during rain events.

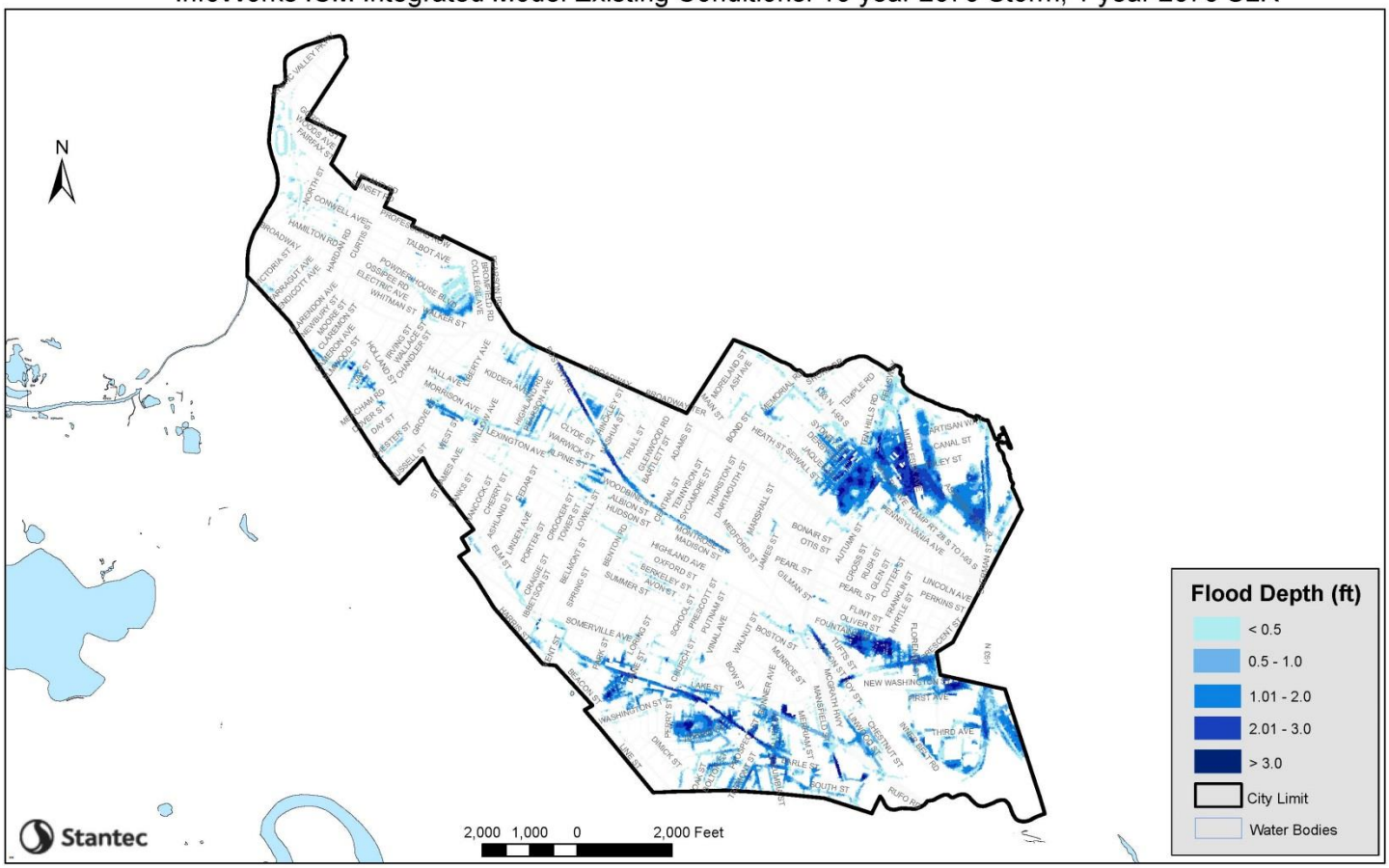
Storm Type	Present-day Rainfall	2030 Rainfall	2070 Rainfall
10-year (10% annual chance), 24-hour	4.9 in	5.6 in	6.4 in
100-year (1% annual chance), 24-hour	8.9 in	10.2 in	11.7 in



This map shows the impact of both precipitation-based flooding and sea level rise and storm surge. This map shows the modeled flood depths of a 100-year, 24-hour Design Storm with 1-year storm surge and sea level rise projections in 2030. Unlike the maps above, this includes modeling of the drainage system, which takes into account how water will be conveyed out of the city. The model is

based on how the system is designed to function, so actual areas of flooding and depth of flooding could vary (Stantec, 2019).

InfoWorks ICM Integrated Model Existing Conditions: 10 year 2070 Storm, 1 year 2070 SLR



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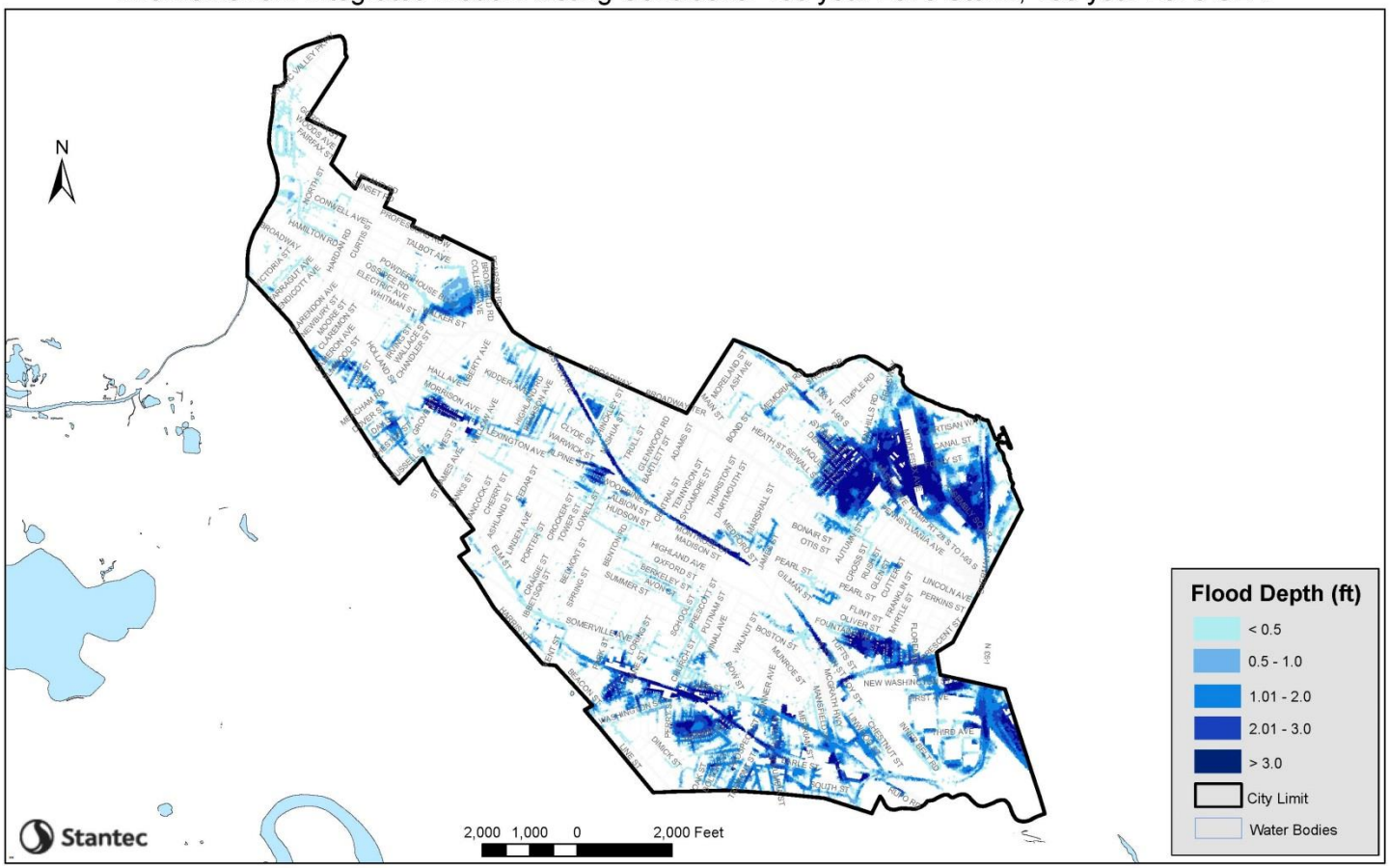
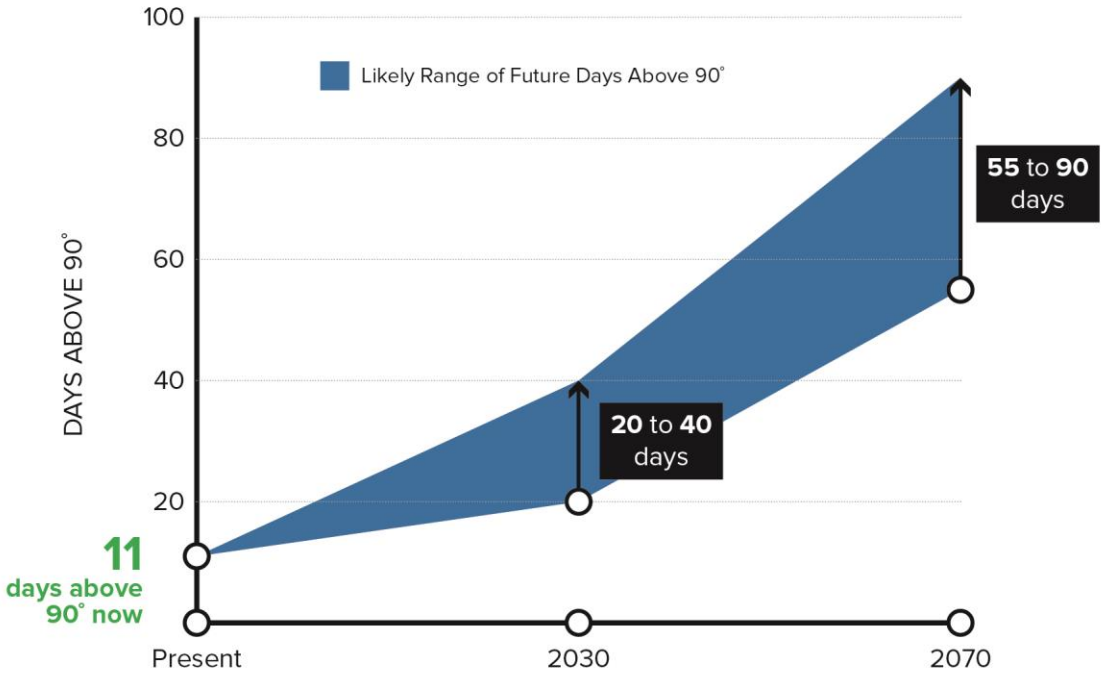
InfoWorks ICM Integrated Model Existing Conditions: 100 year 2070 Storm, 100 year 2070 SLR



This map shows the impact of both precipitation-based flooding and sea level rise and storm surge. This map shows the modeled flood depths of 2070 100-year, 24-hour Design Storm with 100-year storm surge and sea level rise projections in 2070. This map includes modeling of the drainage system, which takes into account how water will be conveyed out of the city. The model is based on how the system is designed to function, so actual areas of flooding and depth of flooding could vary (Stantec, 2019).

Temperature Projections



(Somerville Climate Change Vulnerability Assessment 2017)

Temperature	1971-2000 (average)	2030 (low)	2030 Avg. (high)	2070 (low)	2070 Avg. (high)
Annual	50.0º F	53.3º F	53.5º F	55.8º F	58.7º F
Summer	70.6º F	74.5º F	74.8º F	77.4º F	80.6º F
Winter	29.8º F	32.2º F	33.0º F	34.6º F	38.0º F

RESOURCES:

For information on net-zero and resilient building and site design, please review the following resources:

- Passive House Principles
- Architecture 2030 Palette (Net-zero design tools)
- Building Resilience in Boston
- Enhancing Resilience in Boston
- A Better City's Resiliency Toolkit

- **Ready to Respond: Strategies for Multifamily Building Resilience**

For additional information visit www.somervillema.gov/sustainaville

SUSTAINABLE & RESILIENT BUILDINGS QUESTIONNAIRE

Section 1: Proposal Information

Proposal Name	44 Broadway
Address	44 Broadway, Somerville, MA 02145
Developer	Highland Development
Business Address	100 Winchester St, Medford, MA 02155
Designated Contact	Ben Rogan
Telephone Number	781-393-0006
Contact's Email Address	ben@highlanddevelopment.net
Date Submitted	11/16/2020
Filing Type (Development review application, Building Permit, or CoA)	Development Review Application
Is this a revised Questionnaire?	No
Is MEPA Approval Required?	Yes/No; Why? No, Private Development

Section 2: Building & Site Details

2.1 Building Information

Building Uses	Mixed use, commercial and Residential
Gross Floor Area	77,416 SF
Expected Life of Building	100 Years
Expected Life of Building Systems: HVAC, electrical, boilers, plumbing, telecom, lighting, energy management.	20 Years
Type of Heating System(s)	Split System/Heat Pump
Type of Cooling System(s)	Split System/Heat Pump

2.2. Green Building

Green Building Professional(s): Name(s) and contact information	Philip Sima, Balance Architects, 197 8th Street, Boston, MA Ian Johnson, Linnean Solutions, 11 Stearns Street, Cambridge, MA

Professional Credentials: Green Building Program Certification(s)	Certified Passive House Consultant, LEED AP, WELL AP, LFA
Building LEED Rating	LEED Midrise V4 Platinum "Certifiable"
Building LEED Point Score	~~70~~93.5
Will you pursue LEED certification through the USGBC?	No
Are any other green building certifications being pursued? (Passive House, Enterprise Green Communities, etc.). Please describe.	No

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 future[1]. 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	#26 Parking Spots
EVSE Plugs (number and voltage/ level of plugs)	#4 Spaces 240 volt/Level 2

[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

EV Ready Spaces (everything but station is installed)	# 4?
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?	SWTCH

2.4 Key Building Efficiency Metrics

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

Vertical Envelope Performance:

Residential Floors

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	81%	R-13+R10c.i.	0.0434	59%	R-20+3.8c.i.	0.0420
Opaque glass, curtain wall, shadowbox, spandrel	NA – ASHRAE reference building has no spandrel			0%	NA	NA
Vision glass	19%	R=2.38	U= 0.42 *(note 3)*	41%	2.38	0.42
	100%	*0.114954*	***Aggregate U*** *(note 4)*	***100%***	***0.1969***	***Aggregate U*** *(note 4)*
		R-8.699	***Aggregate R***		***R-5***	***Aggregate R***

Retail Space 1st Floor:

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	81%	R-13+R10c.i.	0.0434	61%	R-20+3.8c.i.	0.0420
Opaque glass, curtain wall, shadowbox, spandrel	NA – ASHRAE reference building has no spandrel			0%	R-2.38	0.420
Vision glass	19%	R=2.38	U= 0.42 *(note 3)*	39%	R-2.38	0.420
	100%	*0.114954*	***Aggregate U*** *(note 4)*	***100%***	***0.18563025***	***Aggregate U*** *(note 4)*
		R -8.699	***Aggregate R***		***R-5***	***Aggregate R***

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)	0.35	0.35 or better
Aggregate Vertical Envelope R	R-13,+R3.8 ci **OR** R-20	R-13+R3.8 or better
Roof R	R-30ci	R-30 or better
Lowest level conditioned floor above unconditioned space (if any) R	R-19+R-11 Ls **OR** R-25 +R8 Ls	R-19+R11 above garage
Cooling End Use (kBtu/sf-yr)	4	3
Heating End Use (kBtu/sf-yr)	18.7	14
Peak Heating (kBtu/hr-sf)	15	12
Peak Cooling (kBtu/hr-sf)	13	10
Site EUI (kBtu/hr-sf)	44	33

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.

The building has been designed to minimize leakage and maximize energy performance. The building envelope is design to exceed ASHRAE 90.1-2013 requirements for R-values and U-Values. This allows the building to minimize HVAC system sizes which reduce overall building operation energy requirements. The windows have been designed to meet code requirements and to limit excessive solar heat gain into the building, while also maintaining comfort and minimizing condensation with good U-values. Heating and cooling will be performed by individual or shared Heat Pump systems and will be all electric. Ventilation will take place using HRVs (Heat Recovery Ventilators) to aid in pre-tempering the incoming air with the exhaust air.

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.

No, this building will not be net zero

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.

MassSave incentives will be investigated.

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?

Some on-site solar panels may be installed on the roof as there is room for a system to help reduce the building's overall energy use.

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

Not 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.

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).

Yes, the roof will be white or use light colored pavers to reduce heat island effect. The roof will also include solar panels.

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?

The site is outside major flood zones according to the Storm and Flood maps of Somerville. However the project is still taking precautions against flooding and incorporating resilience strategies into the design as follows:

1. Elevated living space – podium style keeps all residential units above first floor.
2. Surface stormwater management with planting and water holding storage

To handle changing temperatures and incorporate passive survivability the project includes:

1. Envelope efficiency
2. Elevated equipment (Rooftop)
3. Distributed heating and cooling

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.).

The building is being designed to start with a high performance building envelope, using continuous exterior insulation mixed with interior insulation to create a cohesive envelope and retain cooling from the systems in the summer. The building will also use windows selected to minimize additional solar heat gains on the southern and western sides of the building, to reduce additional heating from solar radiation. Mechanical systems (heat pumps) will provide individual cooling to each unit separately to be resilient in times of failure and to meet comfort levels of different individuals. Each unit will include several operable windows for extreme times when HVAC systems may fail.

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

The building is being design with individual heat pumps on the roof. This allows each unit occupant to cool their space to their needs. Window blinds will be provided for south facing units to aid in keeping the rooms cooler during the hours of direct sunlight. Solar shading systems for the south side may evaluated as needed.

5.3 List any indoor spaces without cooling and their uses.

All spaces will be provided with cooling except the garage area.

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

High albedo pavement and roofing materials will be utilized, passive cooling and increased ventilation, heat resistant trees and plantings will be installed at street level.

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 the site is not in the high risk zones, storm surge and rain events. The building design is still taking precautions on these issues and incorporating resilience strategies as mentioned above.

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?

First floor retail space. Below ground is parking garage.

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?

LEED BD+C: Multifamily Midrise v4 - LEED v4

44 Boradway Scorecard

Location: **44 Boradway, Somerville, MA 2145, US**

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

Integrative Process		**Preliminary**	Y	2 of 2	M	*1*	**Verified**	0
IPc	**Integrative Process**			2 of 2		*1*		
Location and Transportation		**Preliminary**	Y	15 of 15	M	*0*	**Verified**	0
LTp	Floodplain Avoidance			Required				Not Verified
Performance Path								
LTc	LEED for Neighborhood Development			0 of 15		*0*		
Prescriptive Path								
LTc	Site Selection			8 of 8		*0*		
LTc	Compact Development			3 of 3		*0*		
LTc	Community Resources			2 of 2		*0*		
LTc	Access to Transit			2 of 2		*0*		
Sustainable Sites		**Preliminary**	Y	7 of 7	M	*1*	**Verified**	0
SSp	Construction Activity Pollution Prevention			Required				Not Verified
SSp	No Invasive Plants			Required				Not Verified
SSc	Heat Island Reduction			2 of 2		*0*		
SSc	Rainwater Management			3 of 3		*1*		
SSc	Nontoxic Pest Control			2 of 2		*0*		
Water Efficiency		**Preliminary**	Y	10 of 12	M	*0*	**Verified**	0
WEp	Water Metering			Required				Not Verified
Performance Path								
WEc	Total Water Use			0 of 12		*0*		
Prescriptive Path								
WEc	Indoor Water Use			6 of 6		*0*		
WEc	Outdoor Water Use			4 of 4		*0*		
Energy and Atmosphere		**Preliminary**	Y	31 of 37	M	*1*	**Verified**	0
EAp	Minimum Energy Performance			Required				Not Verified
EAp	Energy Metering			Required				Not Verified
EAp	Education of the Homeowner, Tenant or Building Manager			Required				Not Verified
EAc	Annual Energy Use			28 of 30		*0*		
EAc	Efficient Hot Water Distribution System			2 of 5		*0*		
EAc	Advanced Utility Tracking			1 of 2		*1*		

Materials and Resources		Preliminary	Y	4.5 of 9	M	0	Verified	0
MRp	Certified Tropical Wood			Required				Not Verified
MRp	Durability Management			Required				Not Verified
MRc	Durability Management Verification			1 of 1		0		
MRc	Environmentally Preferable Products			0 of 5		0		
MRc	Construction Waste Management			2 of 3		0		

Indoor Environmental Quality		Preliminary	Y	15 of 18	M	0	Verified	0
EQp	Ventilation			Required				Not Verified
EQp	Combustion Venting			Required				Not Verified
EQp	Garage Pollutant Protection			Required				Not Verified
EQp	Radon-Resistant Construction			Required				Not Verified
EQp	Air Filtering			Required				Not Verified
EQp	Environmental Tobacco Smoke			Required				Not Verified
EQp	Compartmentalization			Required				Not Verified
EQc	Enhanced Ventilation			3 of 3		0		
EQc	Contaminant Control			2 of 2		0		
EQc	Balancing of Heating and Cooling Distribution Systems			2 of 3		0		
EQc	Enhanced Compartmentalization			1 of 3		0		
EQc	Combustion Venting			2 of 2		0		
EQc	Enhanced Garage Pollutant Protection			1 of 1		0		
EQc	Low-Emitting Products			3 of 3		0		
EQc	No Environmental Tobacco Smoke			1 of 1		0		

Innovation		Preliminary	Y	5 of 6	M	0	Verified	0
INp	Preliminary Rating			Required				Not Verified
INc	Innovation			5 of 5		0		
INc	LEED Accredited Professional			0 of 1		0		

Regional Priority		Preliminary	Y	4 of 4	M	0	Verified	0
RPc	Regional Priority			4 of 4		0		

Point Floors	
The project earned at least 8 points total in Location and Transportation and Energy and Atmosphere	No
The project earned at least 3 points in Water Efficiency	No
The project earned at least 3 points in Indoor Environmental Quality	No

Total		Preliminary	Y	93.5 of 110	M	3	Verified	0

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