

# Passive House 101: Finch Cambridge

Presented by:  
Jane Carbone  
Director of Development

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Thursday, January 30, 2020

MHP



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# HRI - HISTORY

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- Cambridge-based non-profit affordable housing developer
- Organization founded in 1972 - Initial focus on homeownership stabilization
- Shift in 1980s to provide safe, affordable, decent, and sustainable rental housing
- Developed over 1,500 units of housing
- Currently own 1,336 apartments and 55,000 SF of commercial space in Cambridge & Worcester
- Outsources property management
- Began sustainability initiative in late 1990s



# Path to Passive House

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Sustainable Practices

# HRI - Sustainability Timeline

## LATE 1990s

- EnergyStar
- C&D Waste Management
- Low VOC materials
- Green Specs
- Energy Audits
- Green CNAs
- Energy Conservation Measures
- Healthy Materials

## EARLY 2000s

- Greening Portfolio  
Focus on Designing  
Energy Efficient  
Envelope.
- High efficiency  
condensing boilers
- Water Conservation
- Renewable Energy  
Solar PV , Solar  
domestic hot water

## 2014 - PRESENT

- Implementation of  
strategies to achieve  
close to Net Zero as  
possible
- Health and Wellness  
Goals for residents
- Reduce Operating  
Expenses
- Align with City's Carbon  
Reduction Goals

## FUTURE

- Strengthening  
connections between  
sustainability, resiliency,  
and resident health
- Net Zero
- Mainstream Passive  
House

# PUTNAM GREEN

## LEED Platinum

**GOAL:** Track two different building exterior envelopes, measure performance

- 40 Units
- Completed 2011
- SIPS panels on smaller building
- 2X6 panelized wood frame with 2" rigid on exterior
- Solar PV and Solar Domestic
- Individual condensing units
- Gas fired central boiler
- ERV's/compartmentalization



# PUTNAM GREEN

## SIPs (Structural Insulated Panels)

- Higher R Value 38-40
- Lower utility costs
- Ease of installation
- Assembled in factory
- Quality Control
- Reduces thermal bridging
- First time use for project team



# PUTNAM GREEN Renewables

- 10kW Solar PV System
- 340 sq. ft. of solar thermal collector area
- 254 Sidney st 1.72
- 625 Putnam Green 1.33



The background of the slide is a repeating pattern of stylized palm leaves. The leaves are drawn with thin, parallel lines in a gold color, set against a white background. The pattern is dense and covers the entire area.

# **TAKING ENERGY PATH ONE STEP FURTHER**

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**Passive House Design**

# FINCH CAMBRIDGE

## Formerly Concord Highlands

**GOAL:** Build multi-family housing as energy efficient and resilient as possible = the Passive House standard

- 85% complete
- 98 Units, 100% affordable (LITHTC/WF)
- Passive House Paths :
  - Energy, Systems, Envelope
  - Resilient Features
  - Health and Wellness Goals
  - Active Design features



# PASSIVE HOUSE – WHY??

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## POTENTIAL FUTURE SAVINGS TO BE QUANTIFIED:

- Resilient
- Thermal Comfort- reduction in air infiltration/quiet
- Carbon Reduction
- Energy Efficient
- Health and Wellness Goals
- Operational & Maintenance Savings (Tenant /Owner)
- Verification , Measure and Track

# Finch Cambridge

98 units of Rental Housing

Not directly in the 100 year flood zone

All residential units and other critical buildings located above the 2030 and 2070 design flood elevations

- As recommended by City's Climate Change Vulnerability Assessment and Climate Preparedness Plan

## Design Features

- Defensible Ground floor – 1 story of podium style parking, car (67 spaces) and bicycle (103 plus visitor)
- All usable finished space within the building except garage lobby /vestibule above the design flood elevation
- Materials for the ground floor garage lobby vestibule (below design flood elevation) will be resilient
- Back up power (generator) for elevator, common area lighting, community room
- community room designated as “Shelter in Place” space that has emergency lighting , cooling, and a charging center
- Solar PV for common area loads ( solar battery storage not feasible)

6 floors of residential space

6<sup>th</sup> floor Community room- shelter in place/rooftop open space/laundry room

# FINCH CAMBRIDGE

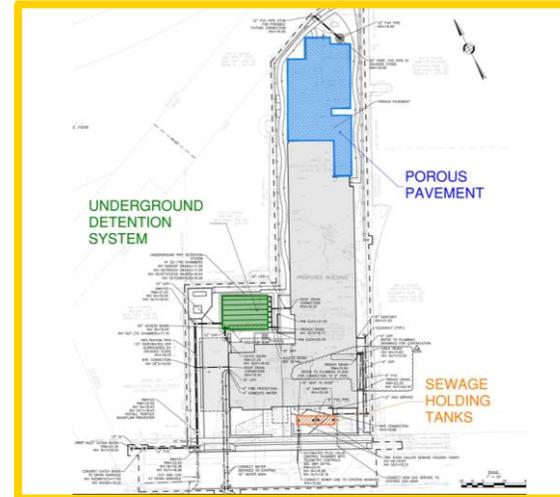
## Resiliency Features



Podium Structure/no living space at ground level



“Shelter in Place” Communal Areas/  
Quiet study rooms



Landscaping Plan - designed to capture stormwater runoff



Sewage Retention tank

# FINCH Cambridge

## Passive House Features



### Envelope/Air Sealing

- 2x6 + 2x8 wall cavity with blown in fiberglass
- Siga Air Barrier



### Insulation

- 2" mineral wool insulation at exterior
- Triple glazed windows
- PH doors



### Heating/Cooling/Ventilation

- 2 ERVs/VRF
- 100KW solar PV
- DHW – gas condensing water heaters

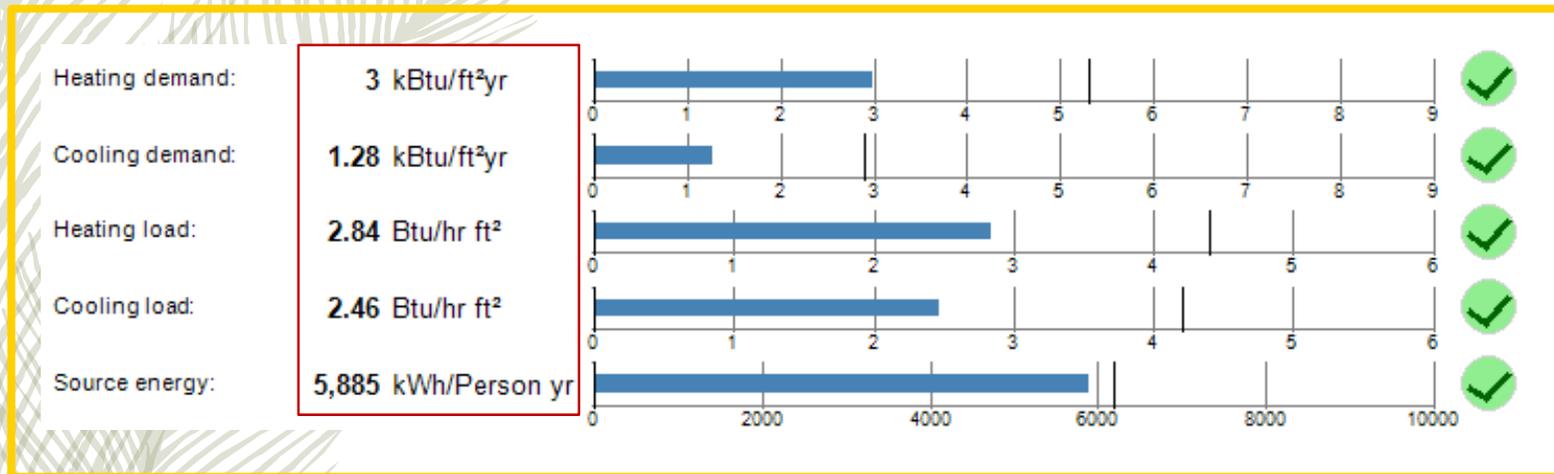


### Compartmentalization

- GWB interior taped/sealed penetration

# FINCH Cambridge Energy Modeling

## Finch Modeling Results



## Targets for PHIUS+ 2015

|                        |                              |
|------------------------|------------------------------|
| Heating Demand Target: | 5.3 kBtu/ft <sup>2</sup> /yr |
| Cooling Demand Target: | 2.9 kBtu/ft <sup>2</sup> /yr |
| Heating Load Target:   | 4.4 kBtu/ft <sup>2</sup> /yr |
| Cooling Load Target:   | 4.2 kBtu/ft <sup>2</sup> /yr |
| Source Energy:         | 6,200 kWh/person/yr          |

THANK YOU

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