

# Beyond Zero Series: Big Buildings, Big Impacts

Building Energy Exchange and NYSERDA are pleased to announce the launch of the new Beyond Zero Series; “Big Buildings, Big Impacts,” a panel discussion about high-impact, high-profile new construction projects: Sendero Verde, a revolutionary multi-building project in East Harlem; and 425 Concourse, a mixed-use, mixed-income development in the Bronx.

Opening Remarks

**Emily Dean, Director of Housing Decarbonization, NYSERDA**

Moderator

**Mark Gardner, Principal, Jaklitsch/Gardner Architects**

Panelists

**Deborah Moelis, Principal, Handel Architects**

**Louis Koehl, Associate, Handel Architects**

**Heather McKinstry, Associate, Dattner Architects**

**Christoph Stump, VP Design and Construction, Trinity Financial, Inc.**

**October 6, 2021 | 9:00 to 10:30am | 1.5 AIA LU|HSW**

**Building Energy Exchange | [be-exchange.org/events](https://be-exchange.org/events) | 31 Chambers St**



**be  
ex**

building  
energy  
exchange

# Beyond Zero Series: Big Buildings, Big Impacts

Building Energy Exchange



**Deborah Moelis, AIA CPHD**

Principal  
Handel Architects



**Louis Koehl, AIA CPHD**

Associate  
Handel Architects

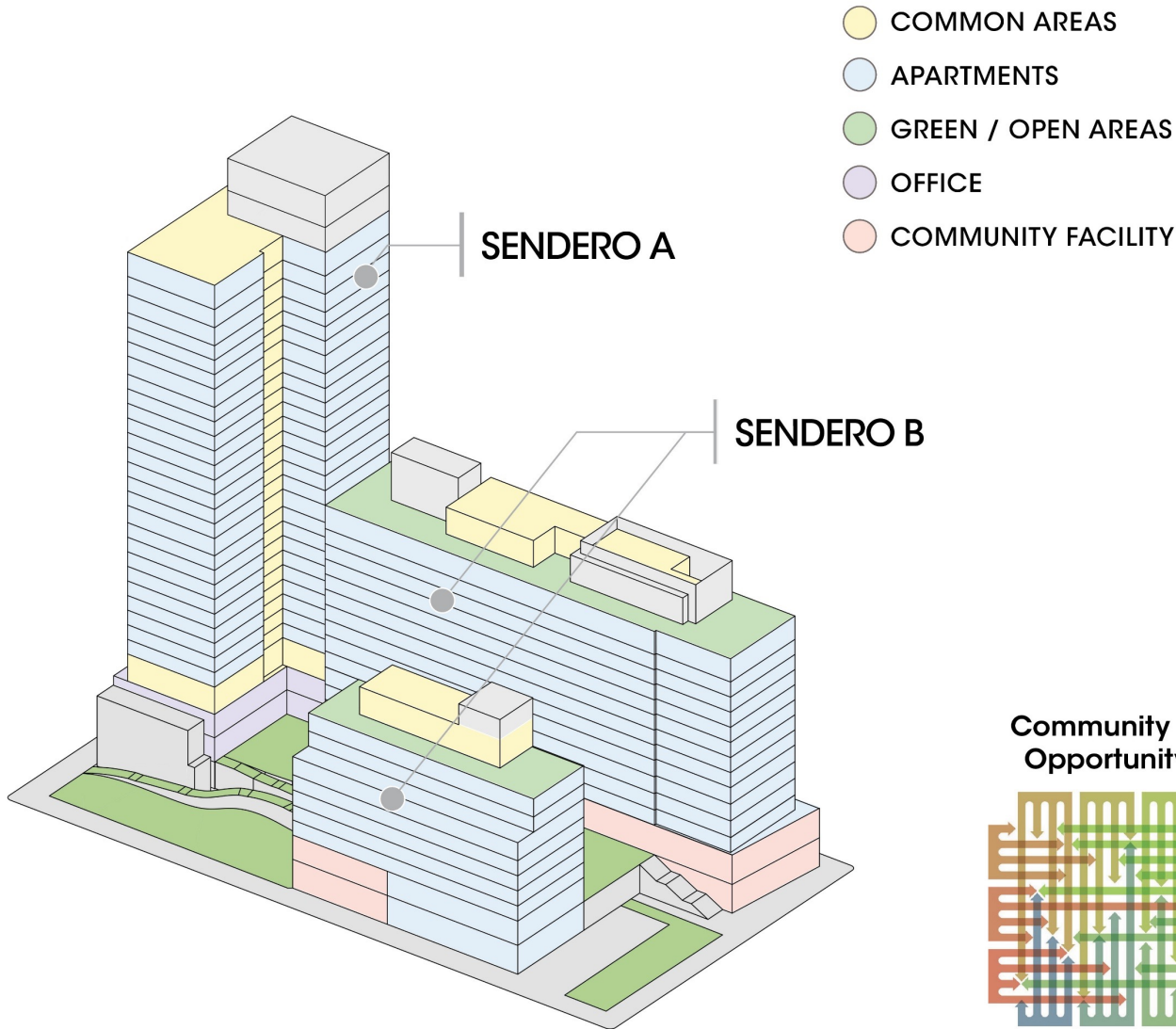
## TEAM

Jonathan Rose Companies  
L+M Development Partners  
Acacia Network  
Handel Architects  
Steven Winter Associates  
Cosentini  
DeSimone Consulting Engineers  
Vidaris

October 6, 2021



# Sendero Verde: Project Summary



## PROJECT SUMMARY

Overall: 750,851 GSF  
Residential: 653,162 GSF  
Community Facilities: 78,829 GSF  
Commercial: 18,860 GSF  
709 Units - 100% Affordable

## USERS



Students



Residents

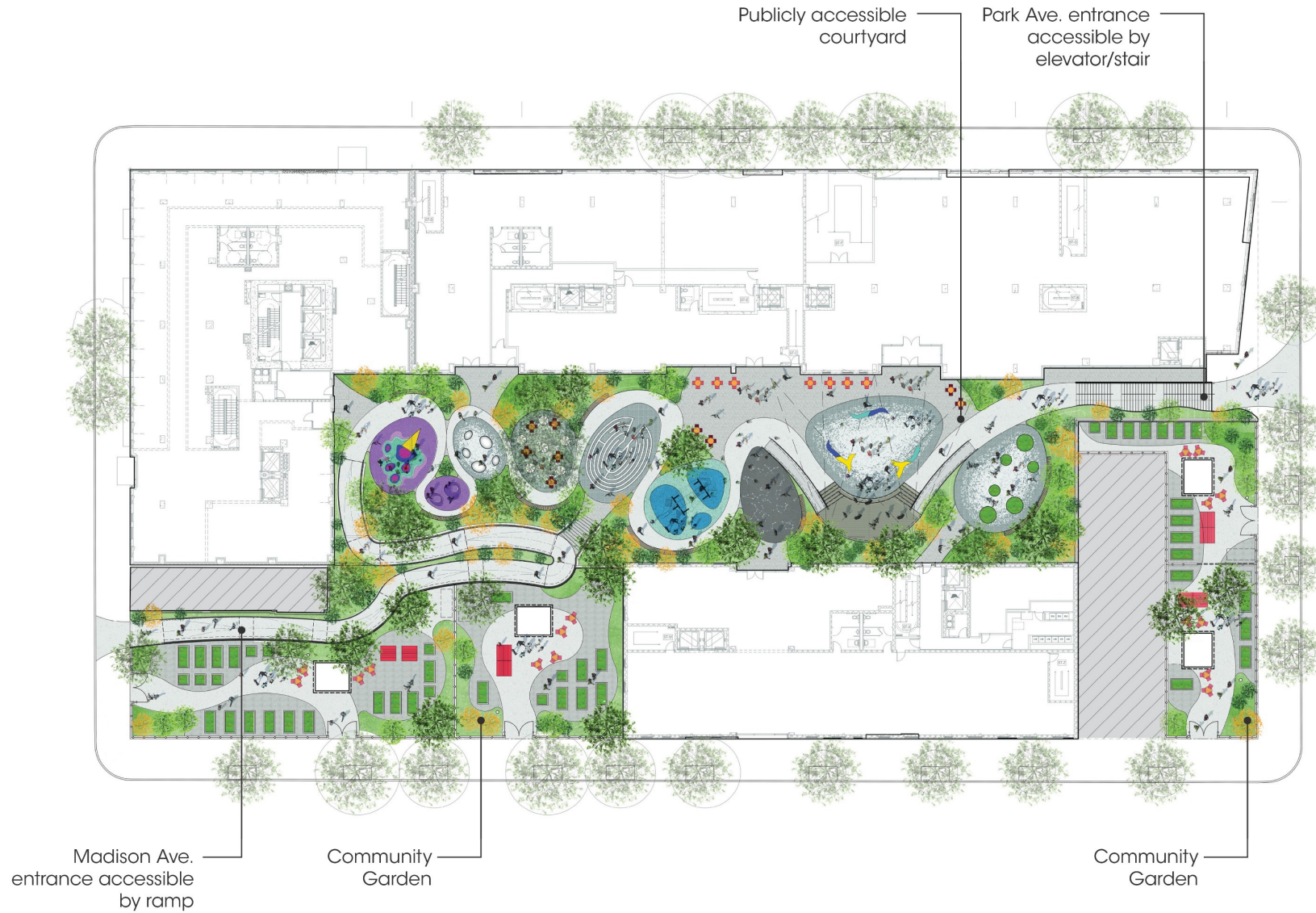


Seniors



Neighbors

# Publicly Accessible Courtyard



# Making the Case for PH

The Passive House Impact: Source Energy Use Intensity (pEUI) Distribution Comparison

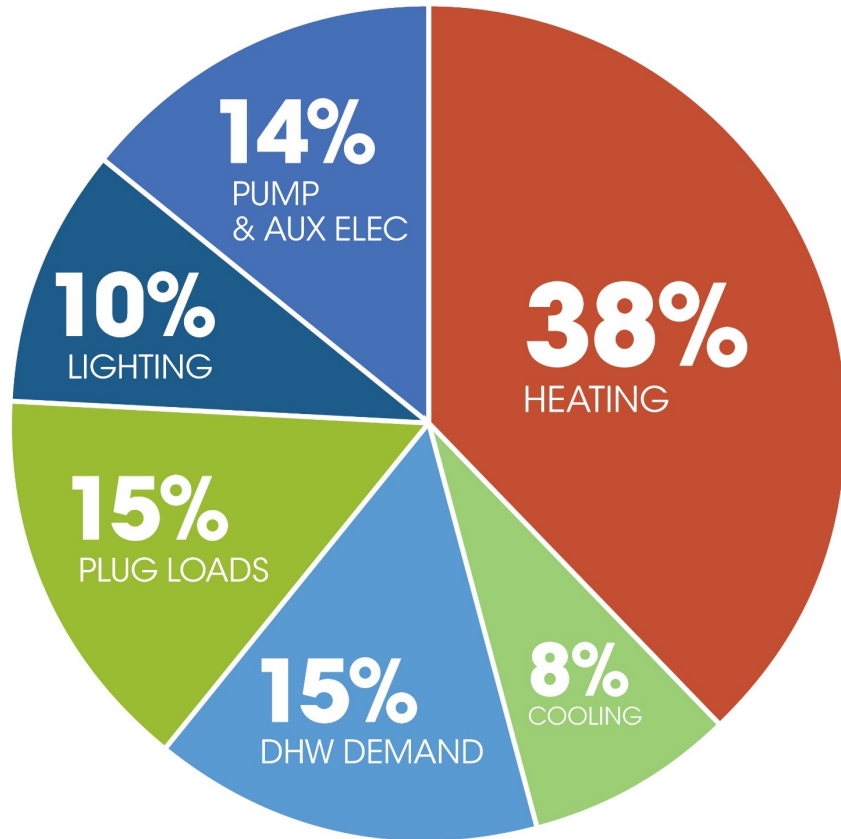
118 kBtu/ft<sup>2</sup>/yr



**58%**  
REDUCTION

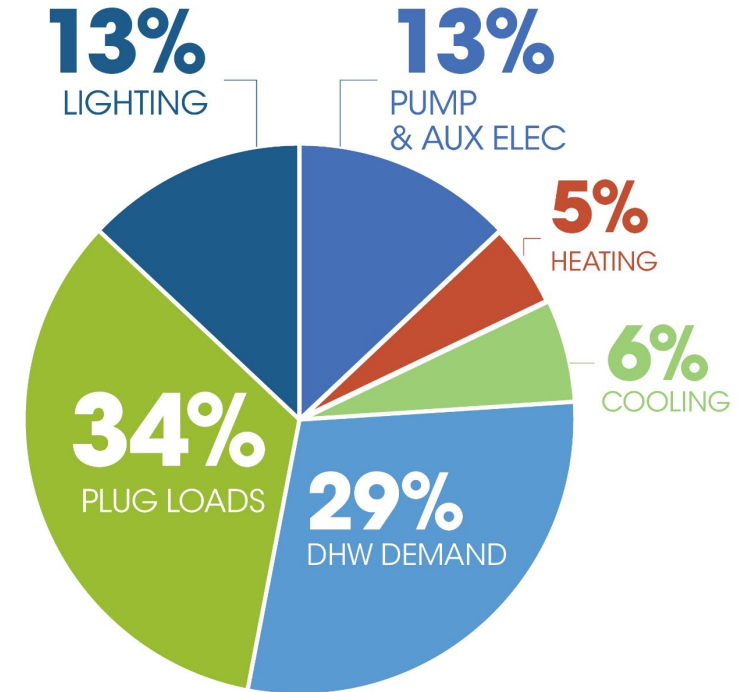


50 kBtu/ft<sup>2</sup>/yr



Typical NYC Multifamily Residential Building<sup>1</sup>

Source : Urban Green Council: NYC's Energy and Water Use Report, October 2017

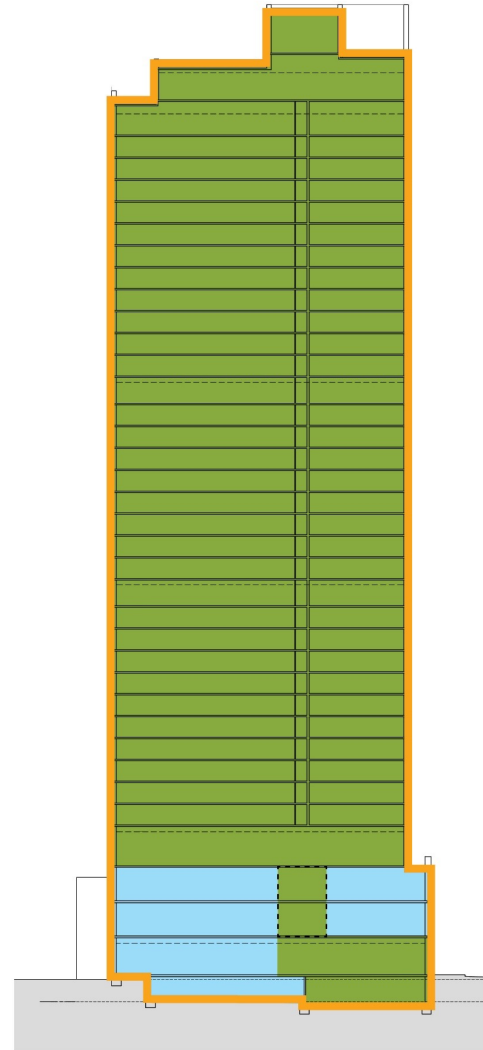


Multifamily Passive House Building

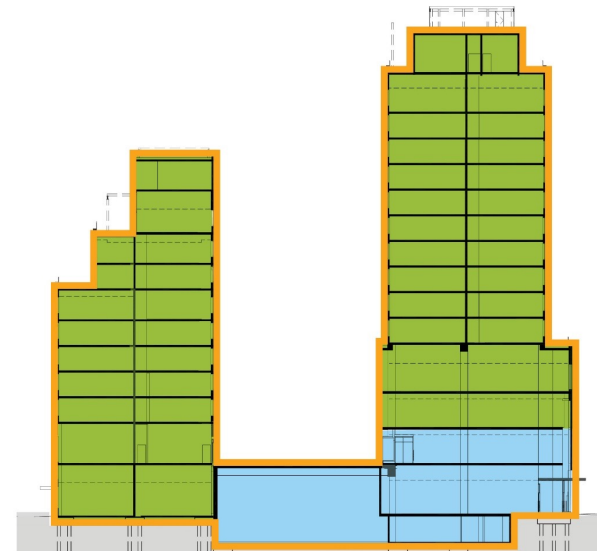
<sup>1</sup>EnergyStar Portfolio Manager, "U.S. Energy Use Intensity by Property Type", April 2021

# Passive House Envelope & Certified Area: Economies of Scale!

- PH AIRTIGHT LAYER
- PH CERTIFIED AREA
- NON-CERTIFIED AREA



SENDERO VERDE A

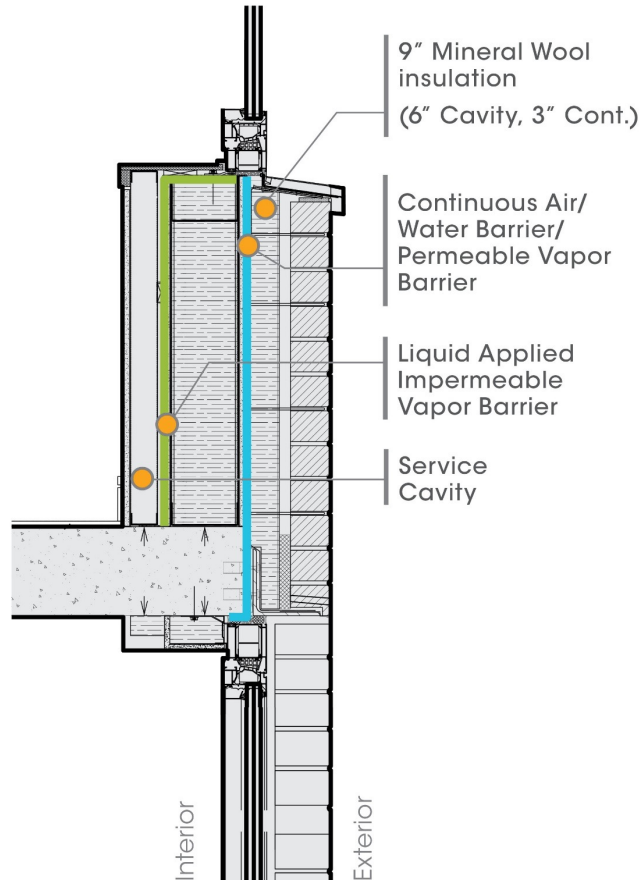


SENDERO VERDE B

# Exterior Wall Assemblies

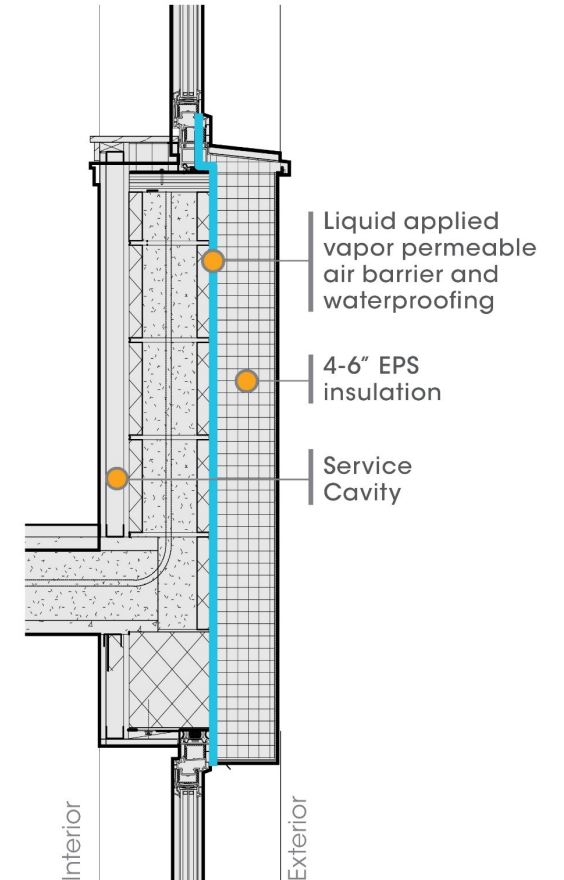
Component	Efficiency
Roof	R-40
Walls	R-23 Effective
Windows - Operable	U: 0.16
Windows - Fixed	U: 0.14
Cantilevered Floors	R-11
Glazing	21%

**SENDERO VERDE A  
MASONRY CAVITY WALL**



Component	Efficiency
Roof	R-40
Walls	R-24 Effective
Windows - Operable	U: 0.15
Windows - Fixed	U: 0.14
Cantilevered Floors	R-11
Glazing	21%

**SENDERO VERDE B  
EIFS**



# Thermal Breaks: AAC Block

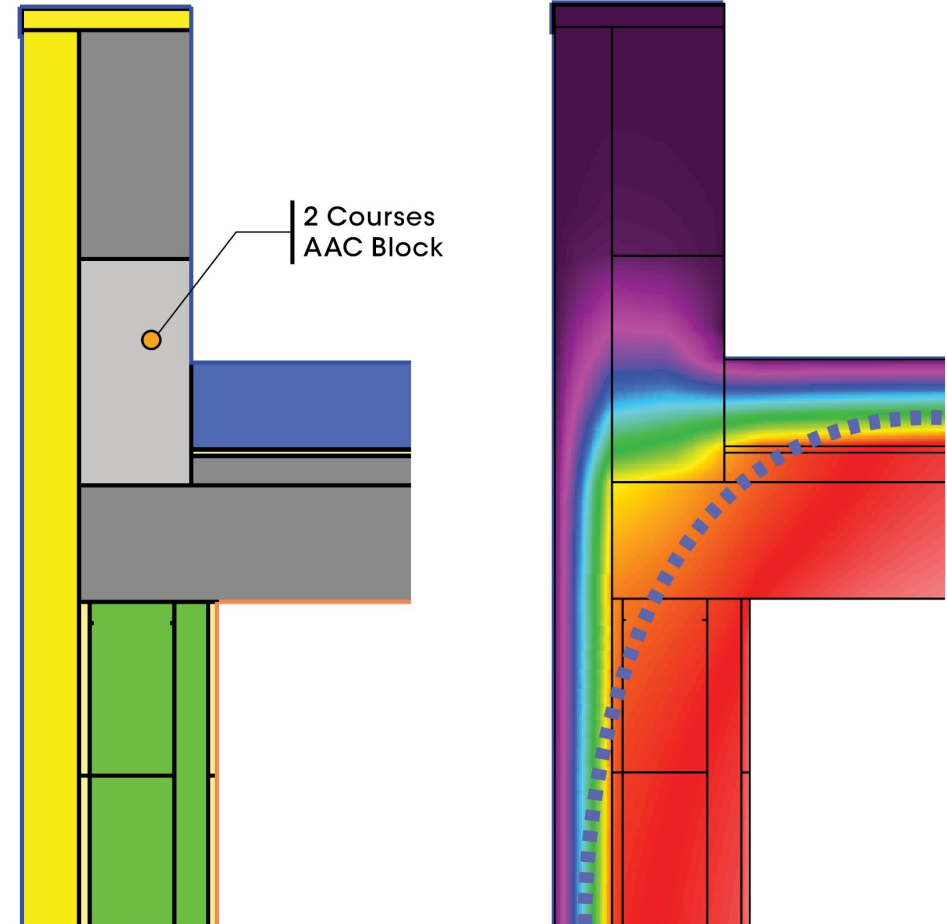


**AAC-1**

Autoclaved Aerated  
Concrete Masonry Units






**AAC BLOCK @ PARAPETS**



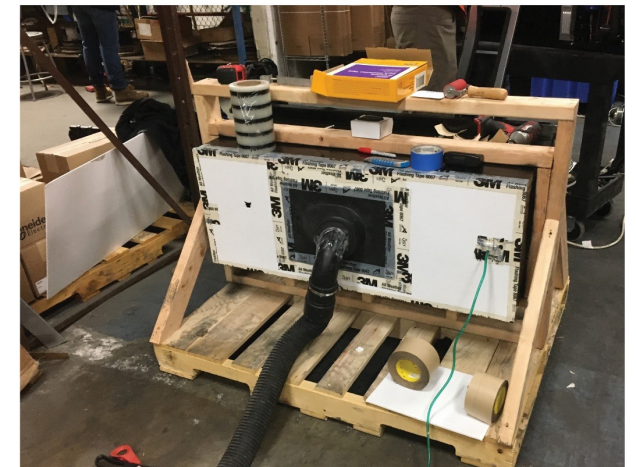
**THERM MODEL @ AAC PARAPET**



# HVAC System Comparison

HVAC Systems			
	Vertical VTAC - Air Cooled Heat Pump with Electrical / Hot Water Heat	Conventional Water Source Heat Pumps* Hybrid Water Source (alt)	VRF - Air Cooled Horizontal Ceiling / Console
			
Pros	<ol style="list-style-type: none"> <li>1. Low first cost</li> <li>2. No parasitic loads for HVAC Equipment</li> <li>3. Ease of maintenance due to location of unit (Floor mounted)</li> <li>4. Con Ed billing for 100% AC load</li> </ol>	<ol style="list-style-type: none"> <li>1. Commercial tenant can utilize base building system</li> <li>2. Ease of maintenance</li> <li>3. Tenant pays for 75% of cooling direct to Con Ed</li> <li>4. No insulation on piping - screw piping - no brazing required</li> </ol>	<ol style="list-style-type: none"> <li>1. Most efficient system for residence</li> <li>2. Quietest system</li> </ol>
Cons	<ol style="list-style-type: none"> <li>1. New release - single manufacturer at current performance - other manufacturers exist but not at the same energy performance</li> <li>2. Additional air sealing required</li> </ol>	<ol style="list-style-type: none"> <li>1. Client has cost associated with Cooling Tower and Pumps</li> <li>2. May require submetering for conventional units in order to deduct heating requirements</li> </ol>	<ol style="list-style-type: none"> <li>1. Difficult to find leaks</li> <li>2. Most expensive system to install</li> <li>3. All copper brazed piping</li> <li>4. Billing performed by the owner for all cooling loads</li> <li>5. Difficult to limit cooling due to shared condensers</li> <li>6. Metering solution determine heating and cooling of the condenser needs to be designed into the system</li> </ol>

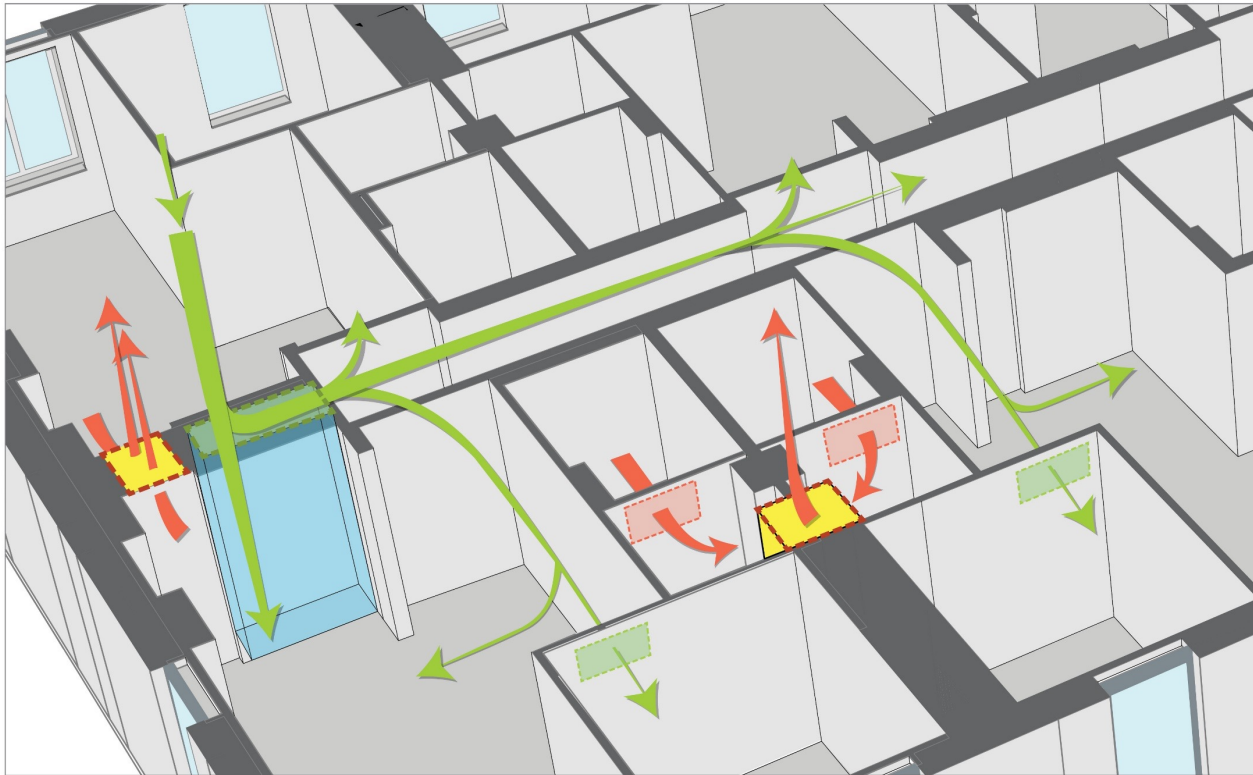
*Cosentini*  
A TETRA TECH COMPANY



# Ventilation

Balanced Ventilation with Heat Recovery Central Systems

- Fresh Air
- Exhaust Air



**SENDERO VERDE: CENTRAL RISER**



**ERVs INSTALLED ON ROOF**

# It's About the People!

- Enhance the living experience!
- Great acoustical separation from neighboring units and exterior.
- Low cost for heating and cooling (equitability)
- Comfortable temperatures, with option for control
- Healthy filtered fresh air 24/7

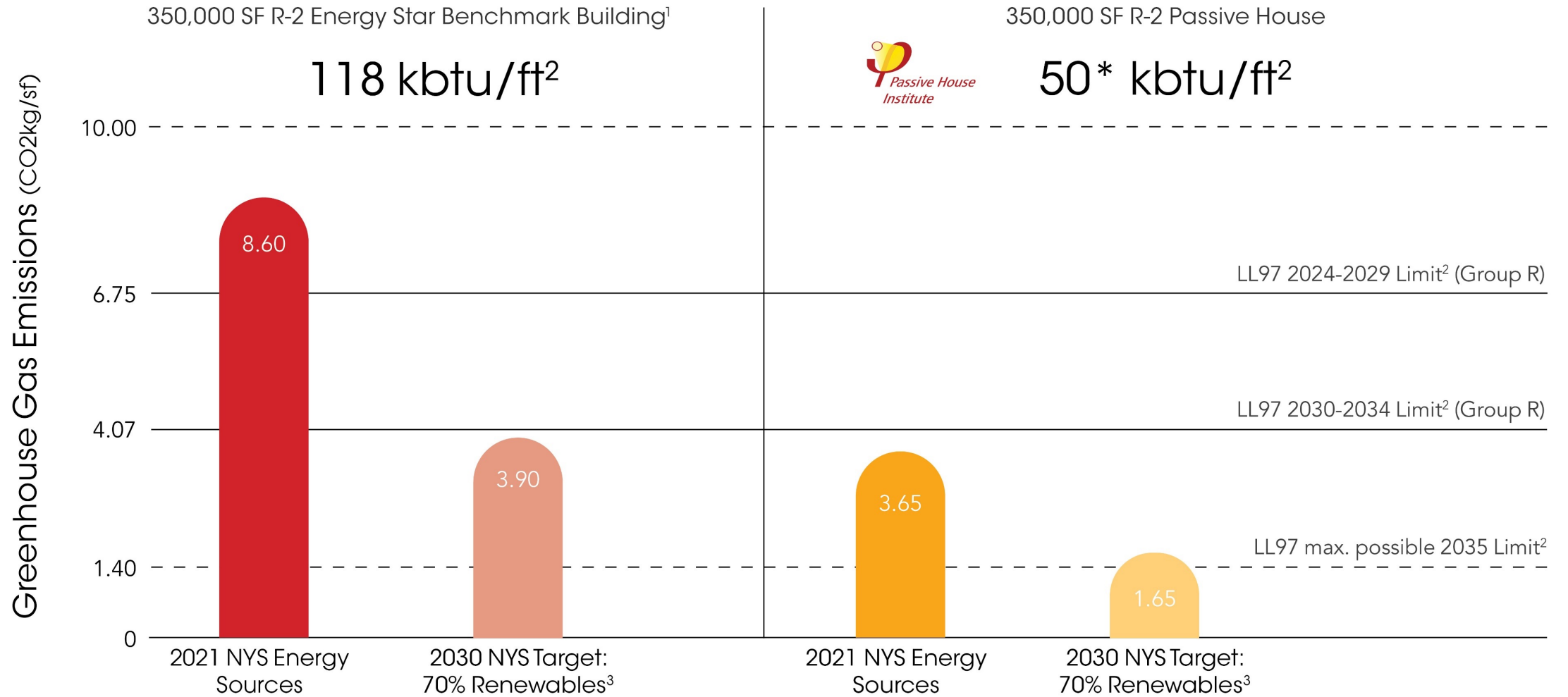




**Thank You!**

# Appendix

# Passive House & Local Law 97: A Case Study



<sup>1</sup>EnergyStar Portfolio Manager, "U.S. Energy Use Intensity by Property Type", April 2021

<sup>2</sup>New York Local Law 97 of 2019

<sup>3</sup>New York Climate Leadership and Community Protection Act

\*Assumed operational Energy Use Intensity, may be adjusted for density.

# NYC ECC Updates Narrow the Gap

Requirements	PH Certification	2020 NYC ECC Compliance
Thermal Bridge (TB) Documentation	<p>Linear and Point TBs must be documented in construction documents. A Psi-value or U-value must be incorporated into the energy model for each TB.</p> <p>Construction photos must be submitted to verify installation for certification.</p>	<p>Linear and Point TBs must be documented in construction documents. A Psi-value or U-value must be incorporated into the energy model for each TB.</p>
Verification of required air tightness	<p>The fully-enclosed building must pass a blower door test to verify an air leakage rate not exceeding 0.6 ACH at 50 pascals.</p>	<p>The fully-enclosed building shall be tested and verified as having an air leakage rate not exceeding three air changes per hour at a pressure of 0.2 inch w.g. (50 Pascals). (R402.4.1.2, with exceptions)</p>
Balanced ventilation and energy recovery	<p>Building ventilation system must be balanced to within 10% and all spaces must be served by an ERV/HRV.</p>	<p>In new buildings, every dwelling unit shall be served by a heat recovery ventilator (HRV) or energy recovery ventilator (ERV) installed per manufacturer's instructions. (R403.6.2, with exceptions)</p>
Limit on total building energy consumption	<p>Must not exceed a maximum source EUI based on occupancy, density, and climate zone.</p>	<p>Future Code Update: Local Law 32 (2018e) requires the 2025 NYCECC to set absolute limits on energy consumption of buildings greater than 25,000sf based on a TBD metric (EUI, carbon, etc.)</p>

NOTE: THIS CHART IS JUST SOME OF A NUMBER OF RELEVANT CODE UPDATES

# 425 GRAND CONCOURSE



**DattnerArchitects**



# PASSIVE HOUSE EXAMPLE PROJECTS

Dattner Architects

## 425 GRAND CONCOURSE

300,000 sf | 277 units | 27 floors



- Cast-in-Place Concrete
- PH System: PHIUS
- VRF: 3 Pipe
- ERV: Centralized
- Metal panels on CMU backup wall
- EUI: 22.4 kBTU/SF/YR

## 1675 WESTCHESTER AVENUE

256,000 sf | 249 units | 12 floors



- Bearing Wall/Block & Plank
- PH System: PHIUS
- VRF: 2 Pipe
- ERV: Centralized
- Brick on CMU backup wall
- EUI: 21.6 kBTU/SF/YR

## CHESTNUT COMMONS

300,000 sf | 275 units | 14 floors



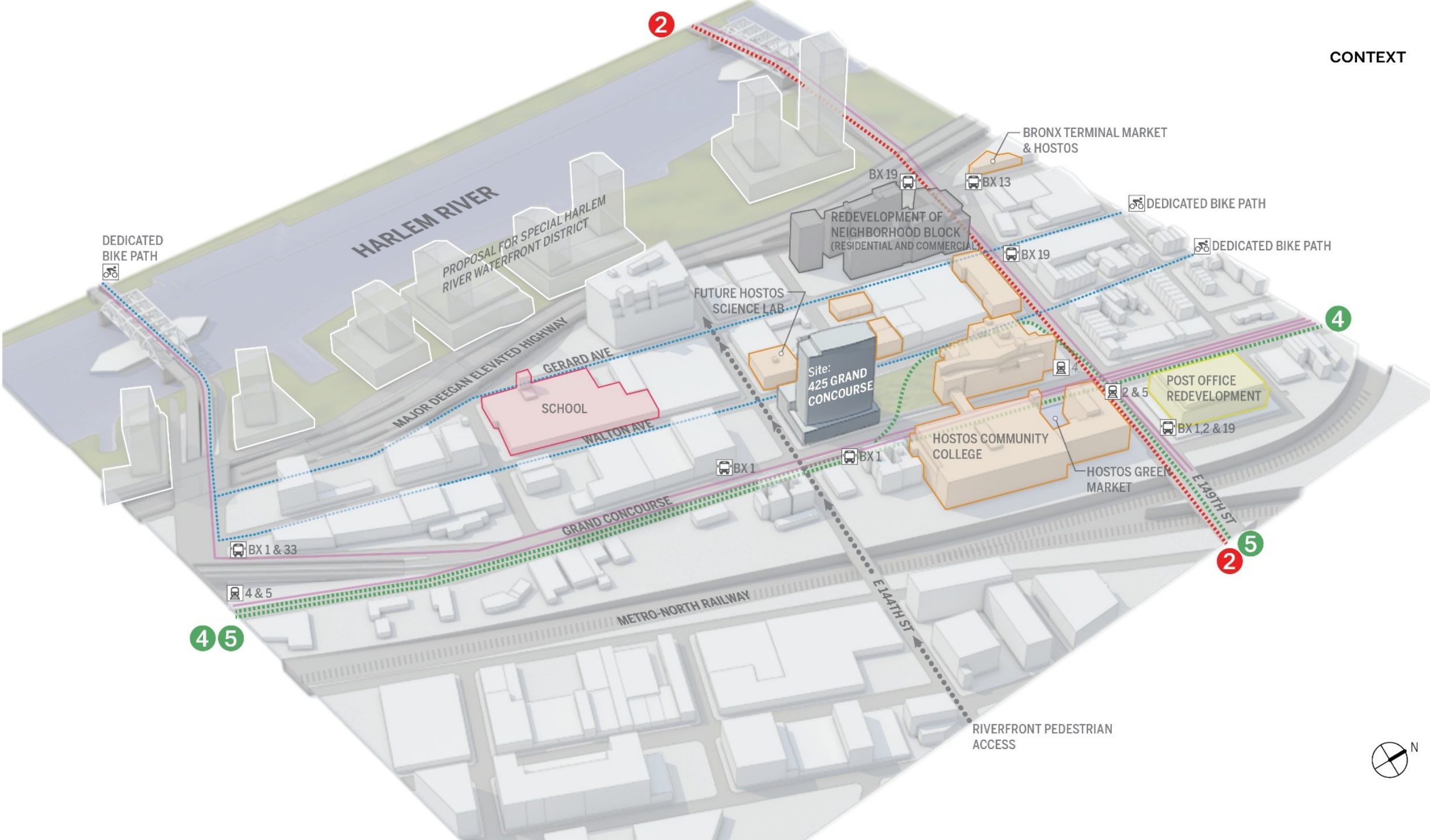
- Cast-in-Place Concrete
- PH System: PHIUS
- VRF: 2 Pipe
- ERV: Centralized
- Brick EIFS on metal stud backup wall
- EUI: 21.14 kBTU/SF/YR

# 425 GRAND CONCOURSE

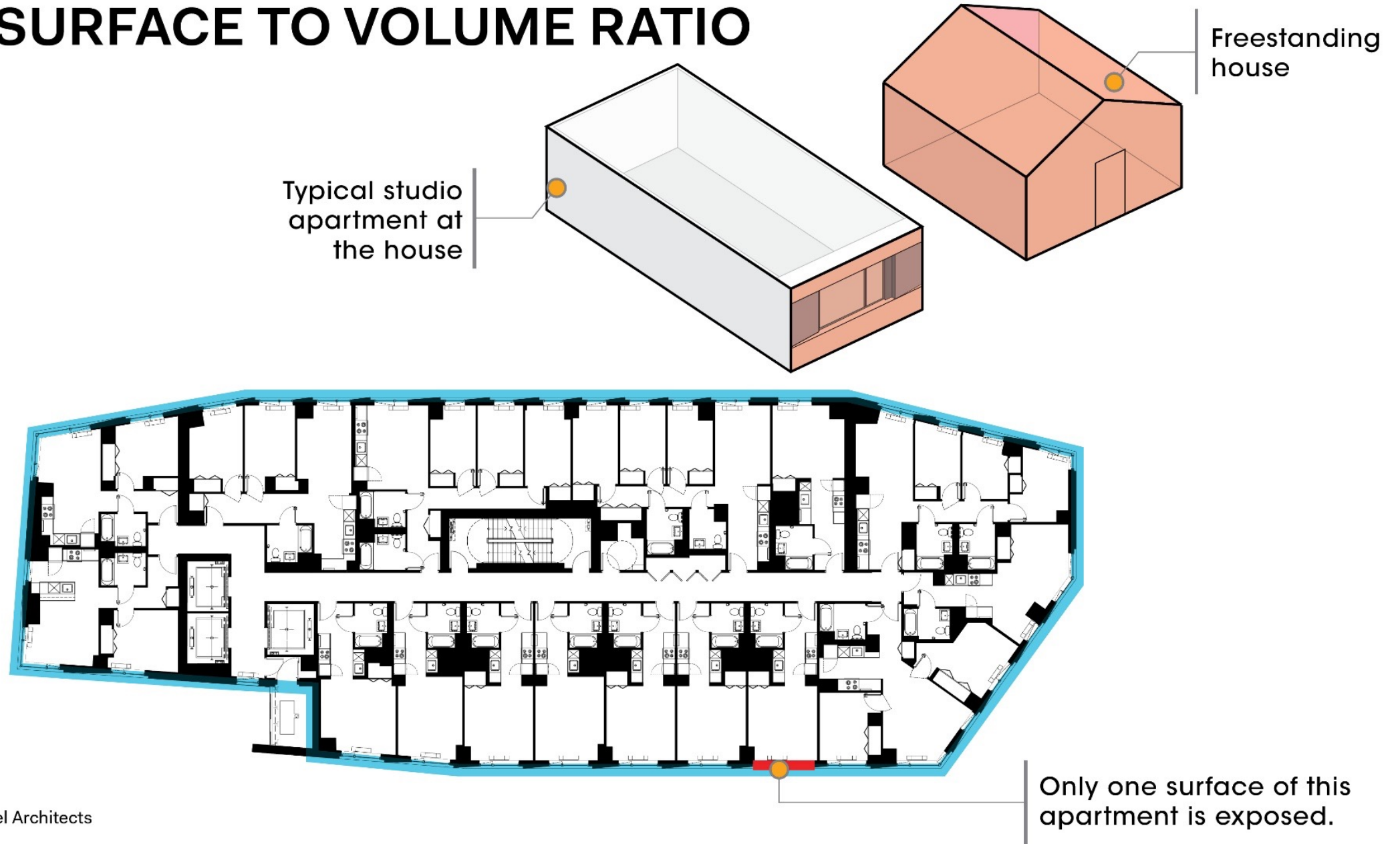
## ENVELOPE EFFICIENCY REQUIREMENTS

ROOF	R-30
ABOVE GRADE WALLS	R-20
BELOW GRADE WALLS	R-10
WINDOWS - INSTALLED EFFECTIVE U-VALUE	0.25 Btu/hr*ft <sup>2</sup> *F
GLAZING SHGC	0.25
FACADE AIR TIGHTNESS REQUIREMENT	0.08 cfm/sf-facade @ 50 Pascals





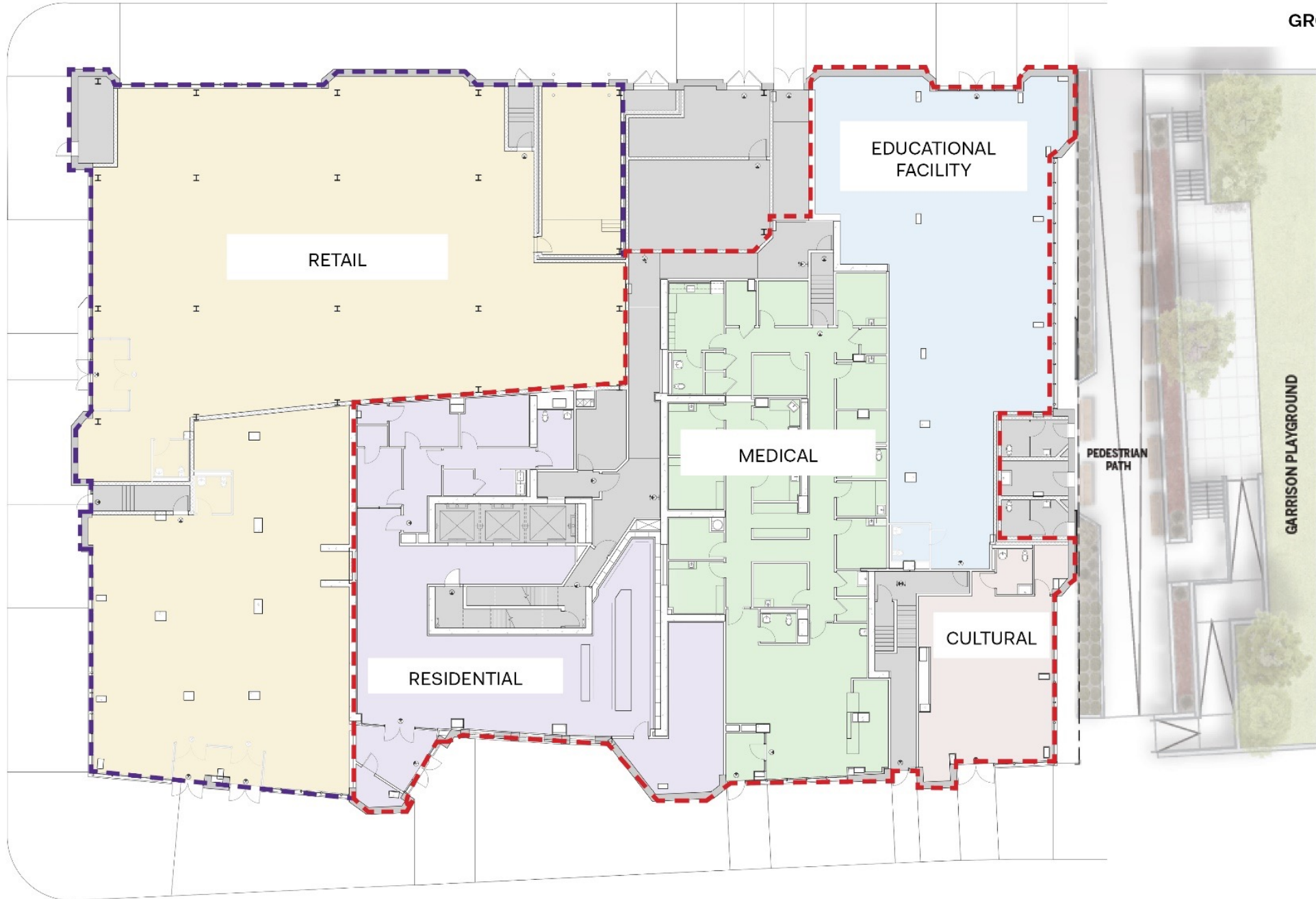
# LOW SURFACE TO VOLUME RATIO



WALTON AVENUE

GROUND FLOOR PLAN

EAST 144TH STREET



EDUCATIONAL FACILITY

RETAIL

MEDICAL

RESIDENTIAL

CULTURAL

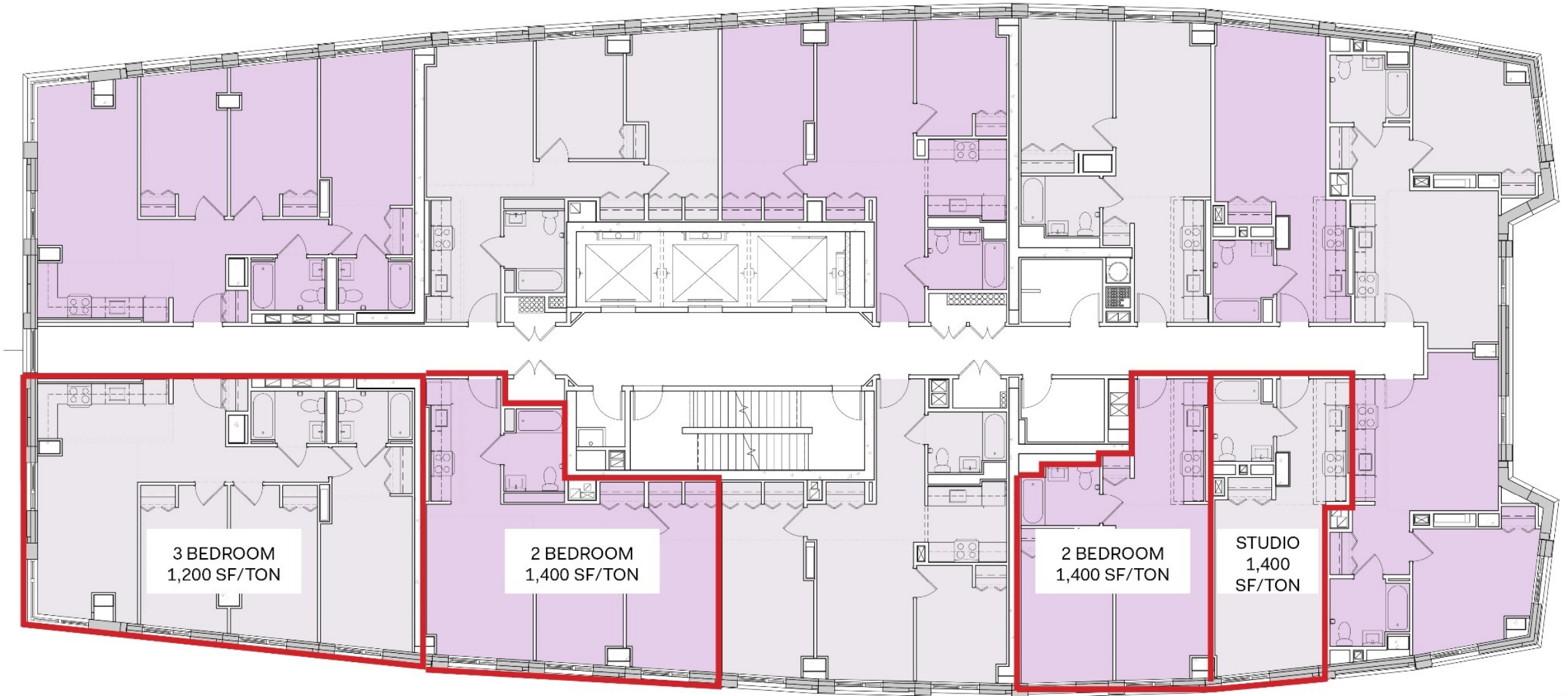
PEDESTRIAN PATH

GARRISON PLAYGROUND

GRAND CONCOURSE



# SYSTEM SIZING



Typical Multi-Family Building: 500-700 SF/TON Cooling Load

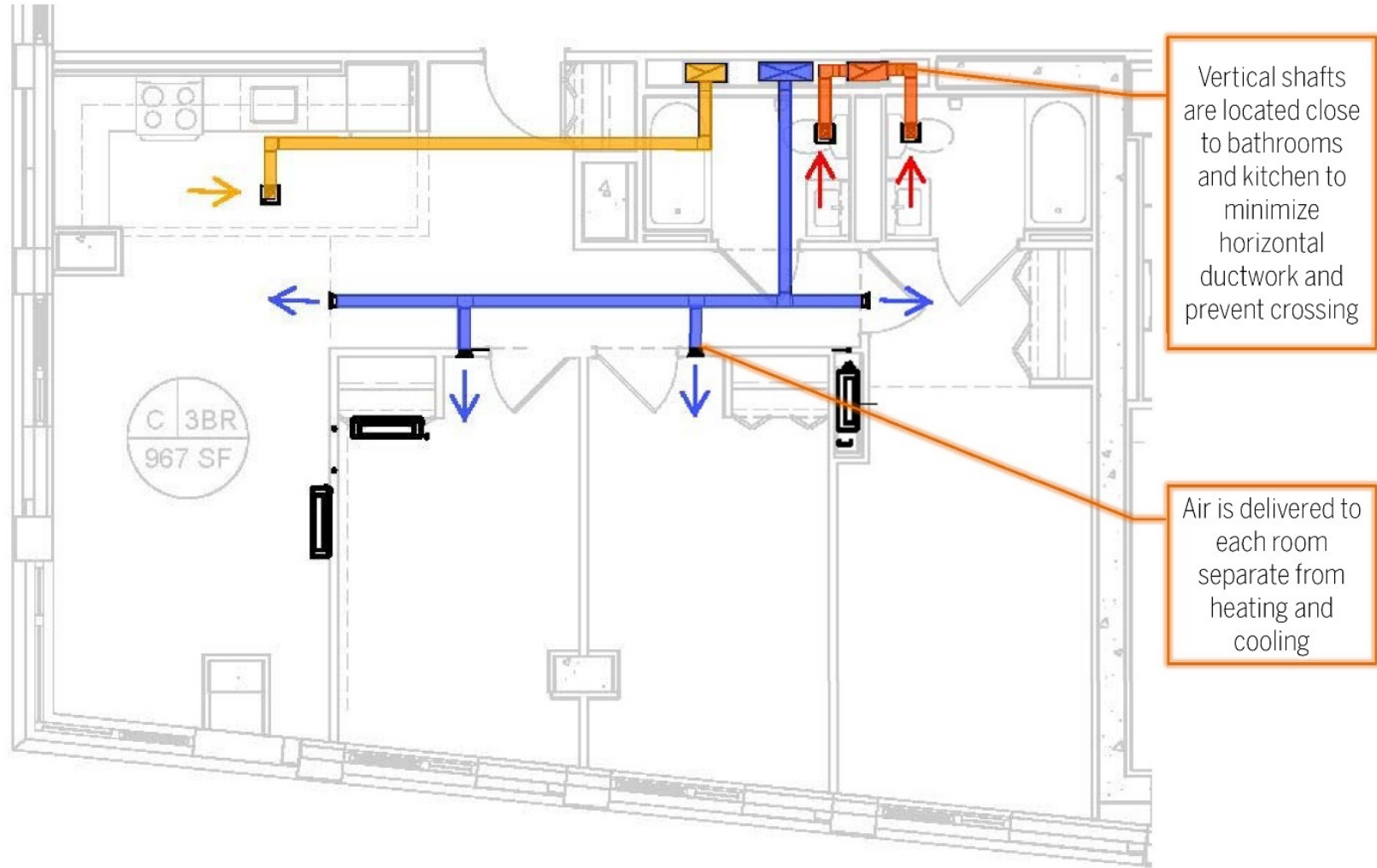


# CONSTRUCTION



# CENTRALIZED ERV DESIGN

425 Grand Concourse






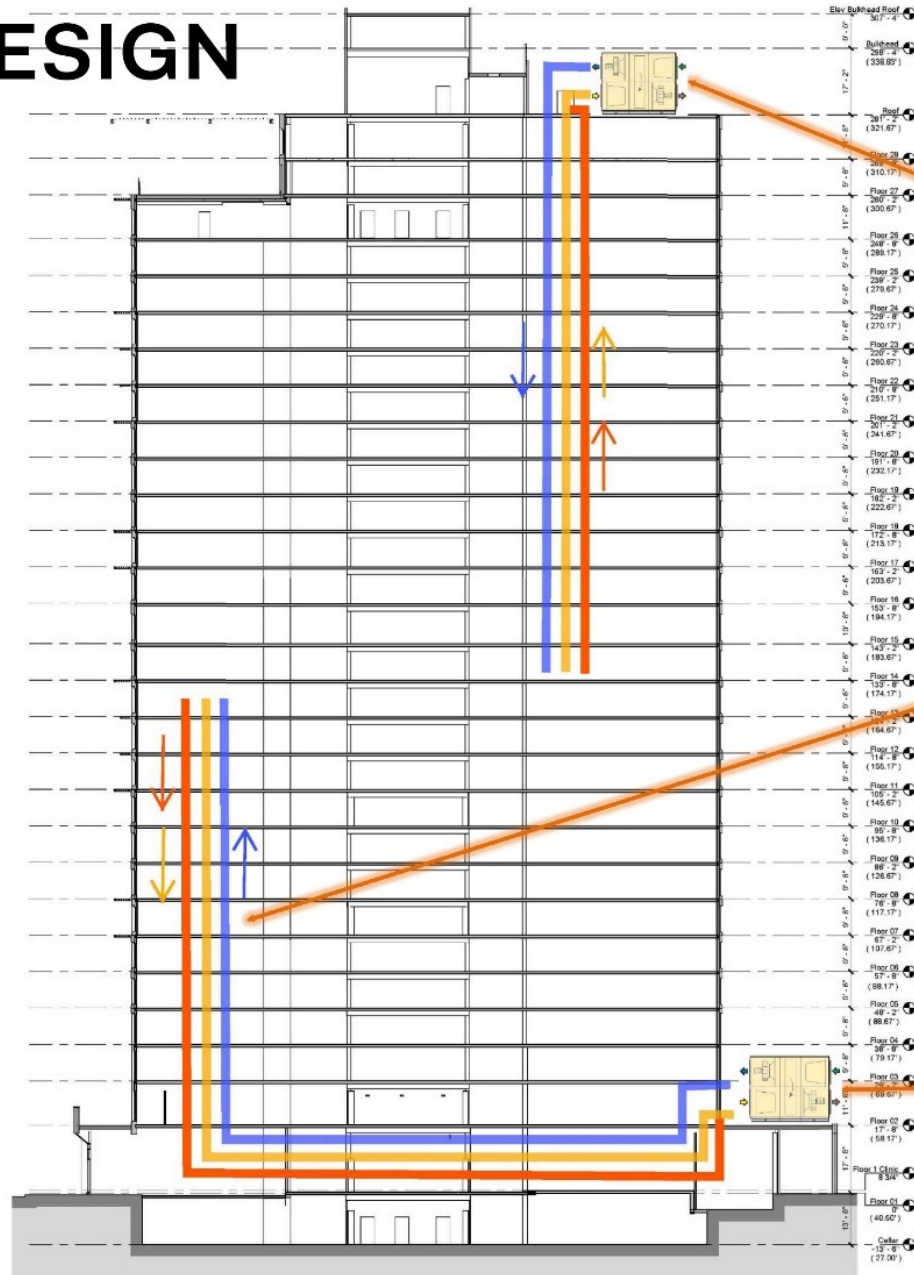
- █ SUPPLY AIR
- █ TOILET EXHAUST
- █ KITCHEN EXHAUST



# CENTRALIZED ERV DESIGN

## 425 Grand Concourse

-  SUPPLY AIR
-  TOILET EXHAUST
-  KITCHEN EXHAUST



ERVs on high roof to supply upper floors

Constant Air Regulators (CARs) on each floor maintain a balanced system

ERVs on low roof to supply bottom floors

# CONSTRUCTION



# INTERNAL MOISTURE—VENTILATION UNITS

## ERV

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### PROS—SUMMER

- Keeps moisture out of interior spaces
- Cooling loads minimized

### CONS—WINTER

- If internal moisture generation high, keeps moisture in

## HRV

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### PROS—WINTER

- If moisture generation high, flushes moisture out of building

### CONS—SUMMER

- High moisture exterior air brought indoors
- Cooling loads increased

# FIELD BUILT ASSEMBLY



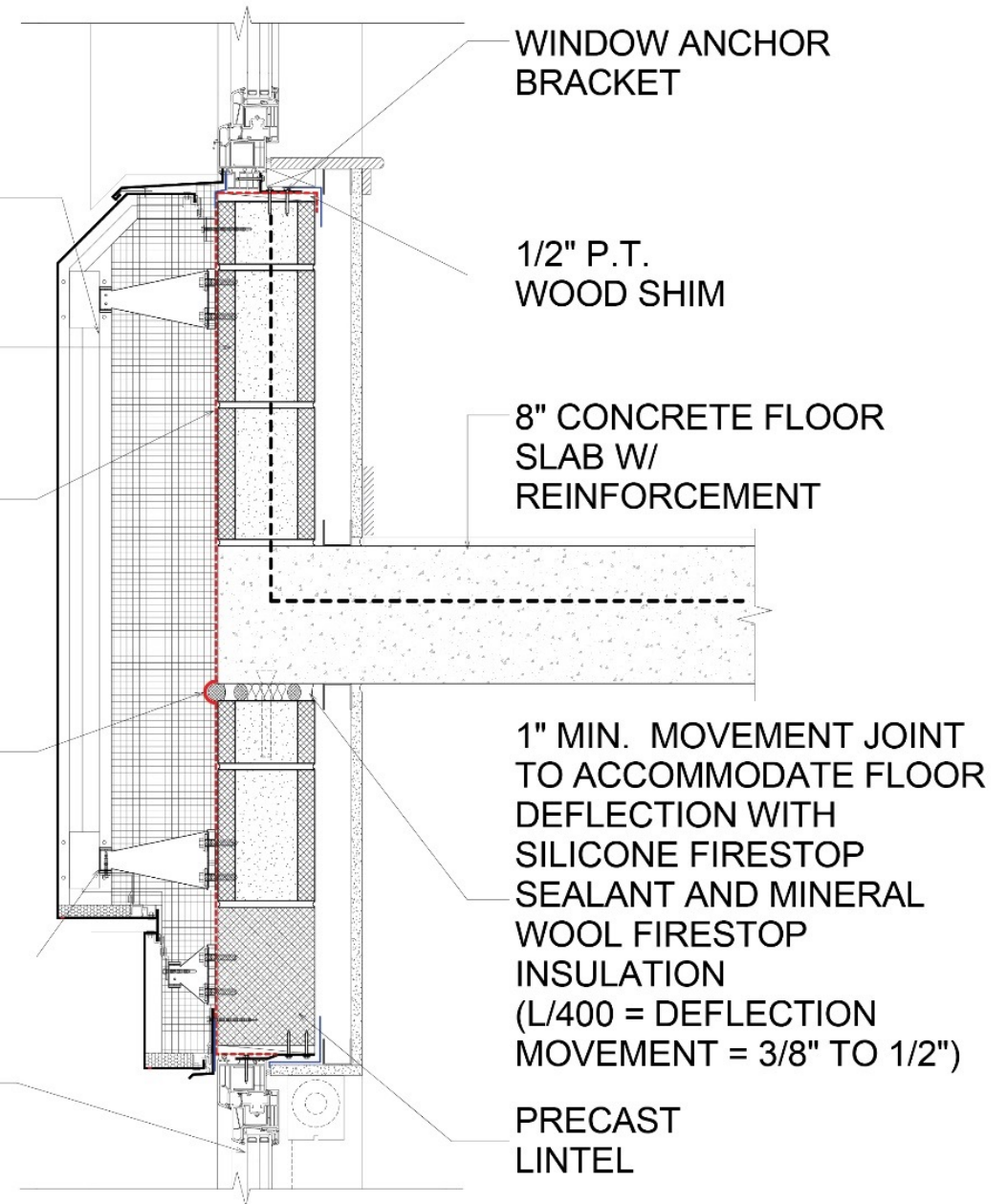
THERMALLY ISOLATING  
RAINSCREEN ATTACHMENT  
SYSTEM [KNIGHT WALL]

6" CMU  
SELF-ADHERED VAPOR PERMEABLE,  
WATER-RESISTIVE BARRIER  
& AIR BARRIER [DELTA VENT-SA]  
FOLD IN TO THE INTERIOR AND TAPE  
ALL EDGES

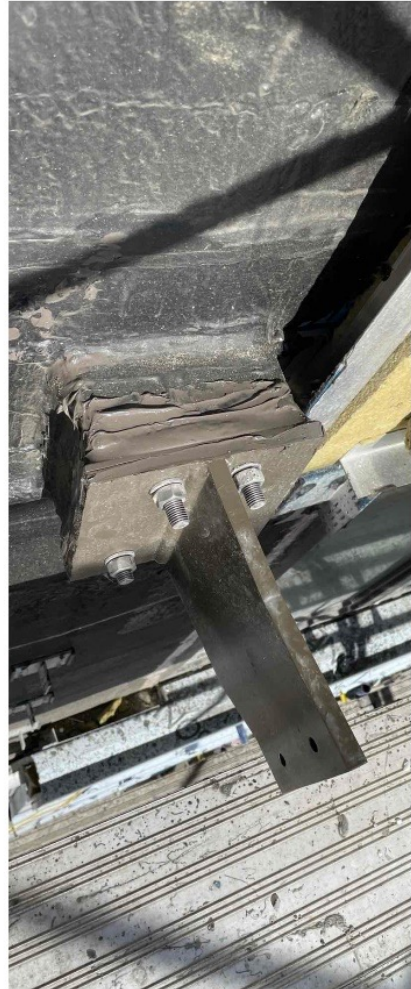
1" FOAM ROD TO ALLOW SELF-  
ADHERED VAPOR PERMEABLE,  
WATER-RESISTIVE BARRIER & AIR  
BARRIER TO MOVE IN DEFLECTION  
( $L/400 = \text{DEFLECTION MOVEMENT} =$   
 $3/8" \text{ TO } 1/2"$ )

THERMALLY ISOLATING  
RAINSCREEN ATTACHMENT  
SYSTEM [KNIGHT WALL]

UPVC OR ALUMINUM WINDOW  
[U-INSTALLED = 0.25 Btu/hr.sf.yr]



# CONSTRUCTION—THERMAL BREAKS



# CONSTRUCTION—WINDOWS



# CONSTRUCTION—EXTERIOR WALL AVB



# CONSTRUCTION—EXTERIOR WALL AVB

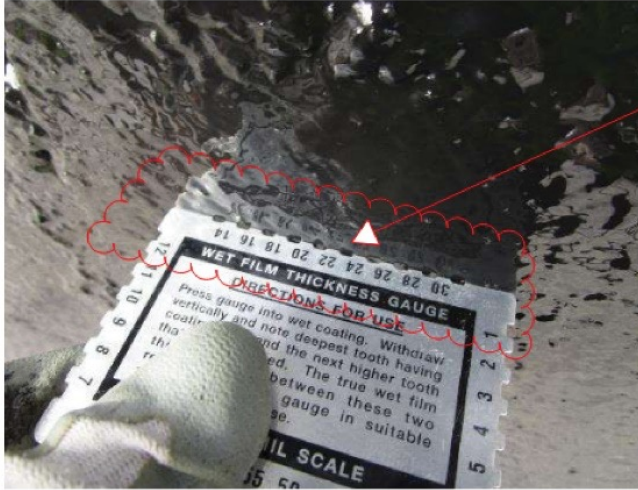


Photo #70.01

○ Application of Henry Air-Bloc All Weather STPE vapor permeable air barrier was observed in progress.



Photo #70.02

○ Minimum wet film thickness was spot checked at multiple locations to be between approximately 22 and 28 mils.





# CONSTRUCTION—SPECIAL CONDITIONS







be  
ex

discuss.

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building  
energy  
exchange



be  
ex

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building  
energy  
exchange

thank you.