BUILDINGENERGY NYC

# Resilient, Cost-Effective, and Carbon Neutral: The Future of New York's Multifamily Buildings

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**Northeast Sustainable Energy Association (NESEA)**
**September 15, 2022**

# Resilient, Cost-Effective, and Carbon Neutral: The Future of New York's Multifamily Buildings

Gwen McLaughlin, Project Manager

September 15, 2022

Building Energy NYC

NEW YORK STATE | NYSERDA

**The Buildings of Excellence (BOE) Design Competition was initiated by NYSERDA in 2019 to recognize and reward the design, construction, and operation of carbon-neutral multifamily buildings that are healthier, more comfortable, and more resilient.**

Rendering of Sendero Verde

# Design Quality & Co-benefits Takeaways

## 1
## Occupant Demographics

Many design teams aimed to support specific disadvantaged communities, such as formerly housing challenged, low-income seniors, and people with chronic illnesses.

## 2
## Adaptive Reuse

Teams noted the importance of including a Passive House consultant and a properly trained general contractor in the early design phases.

## 3
## Site Context

Most Round 1 projects are located within walking distance of public transportation and/or provide access to community amenities and resources.

## 4
## Occupant Health, Comfort, and Productivity

All projects were designed to deliver a higher indoor environmental quality of living.

## 5
## Resiliency

Round 1 resiliency features include maintaining stable internal temperatures, planning for electrical power outages, providing continuous access to clean water, and more.

# Occupant Demographics

## 31 of the 42 Round 1 and 2 projects provide LMI housing

- Reducing the risk of air quality related health problems for residents and community
- Providing services, such as health clinics, day care, and job training
- Offering community facility space

Rendering of La Central

# Occupant Health, Comfort & Productivity

**All Round 1 projects were designed to deliver a higher indoor environmental quality of living.**

- Eliminate risks of onsite emissions
- Filtered ventilation
- Thermal comfort
- Quieter spaces, better acoustics
- Daylighting and visual comfort
- Promoting active lifestyles
- Addressing mental health

Rendering of Perdita Flats

# Indoor Air Quality

**Tighter envelopes require careful ventilation design, resulting in enhanced indoor air quality.**

## Benefits:

- Support occupants with pre-existing conditions (e.g., asthma)
- Protect occupants from outside pollution
- Reduced airborne illness transmission
- Reduced risk of mold/ mildew formation

## Strategies:

- IAQ monitoring
- Energy recovery ventilation
- Advanced filtration (e.g., MERV13)
- Compartmentalization
- Low-VOC finishes
- Reduced contaminants (e.g., lead, radon mitigation)
- Limited combustion


Rendering of 425 Grand Concourse

# Resiliency

**Round 1 and Round 2 projects incorporate many different aspects of resiliency, with a general focus on:**

- Stable internal temperatures in extreme weather
- Planning for electrical power outages through tight envelopes, onsite back up power and storage
- Providing continuous access to potable water
- Storm water management
- Siting critical systems above the 500-year flood plain
- Urban heat island reduction
- Food security (community gardens)

# Planning & Design Approach Takeaways

## 1
### Goals and Motivations

The most frequently stated goals were to create a building that enhances the lives of residents and provide more affordable housing

## 2
### Integrated Teams

Integrated and experienced project teams are critical to the success of high-performance design and construction

## 3
### Design Feasibility

Passive House design is possible in urban areas and high-rise construction, and is a feasible practice for the LMI rental market

## 4
### Replicability

Project teams with a focus on replicability note the importance of creating models for future developments to create a pathway for others to follow

# Replicability Strategies

Rendering of Geneva Solar Village

**All Round 2 projects are aiming for all-electric design. Other strategies:**

- Integrated, experienced teams
- Shortening learning curves
- Simple, replicable design
- Design tradeoffs
- Cost-effective systems
- Quality installation and commissioning

# Design Energy & Carbon Emissions Takeaways

## 1
### Understanding Tradeoffs

Design and performance of envelopes, HVAC, and PV systems are all interdependent

## 2
### Energy Modeling

Early design modeling allows integrated teams to iteratively design to find the best balance of performance and cost effectiveness

## 3
### Passive Design

Passive design strategies can capture solar energy in the winter and shade in the summer to lessen the use of mechanical or electrical devices

## 4
### Embodied Carbon

Projects can use design strategies to reduce embodied carbon or minimize construction and material waste

# Passive Design

**All projects focused on a high-performance envelope, which is central to Passive House design:**

- Willingness to design innovative wall assemblies.
- Focus on very tight construction, low U-factors, avoiding thermal bridging, and moisture concerns (both during and after construction).
- Simple roof and foundation designs, with familiar designs that are easy to quote and install.
- Balance labor and material costs, ease of installation, and durability.
- Common solutions: Prefabricated elements, double or triple pane low-e windows, exterior shading for passive solar design

# Embodied Carbon

**Most Round 1 and all Round 2 projects implemented embodied carbon reduction strategies, including:**

- Adaptive reuse
- Material selection
  - Locally sources materials
  - Concrete mixes
  - FSI certified wood
  - Envelope assemblies (e.g., foam removal)
- Reduced GWP refrigerants
- Labeling systems (e.g., Red List and Environmental Product Declarations)
- Embodied carbon calculators

## Thank you!

## Contact:

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BOE Case Studies:

https://www.nyserda.ny.gov/All-Programs/Multifamily-Buildings-of-Excellence/Winners/Resources

Rendering of St. Marks Passive House,
Provided by Cycle Architecture + Planning

# THE RISE – CONTEXT

## VITAL BROOKLYN INITIATIVE - SITE J

NY State's comprehensive community development strategy to address social, economic, and health disparities in Central Brooklyn

### 8 Integrated Areas of Investment

- Affordable Housing
- Open Space & Recreation
- Healthy Food
- Economic Development & Job Creation
- Education & Youth Development
- Community-based Healthcare
- Violence Prevention
- Resiliency


Xenolith Partners LLC
Community Preservation Corporation
Community Solutions/
Brownsville Partnership

Women’s Prison Association
Osborne Association
Community Capacity Development
Brownsville Think Tank Matters
Spin City Brownsville Plus
Project EATS

Magnusson Architecture and Planning
Bruno Frustaci General Contracting
Bright Power

# THE RISE - PROJECT OVERVIEW

- **76,000+ SF new mixed-use building**
- **72 units of affordable housing**
  - 65% supportive for formerly incarcerated individuals & families
  - 35% affordable for households earning 30%-60% AMI
- **13,000+ SF community facility space**
  - On-site Supportive Services
    - Women's Prison Association & The Osborne Association
  - Local organizations:

    Education, job readiness, employment training, violence reduction, health/wellness, fitness, arts, gardening
    - Community Capacity Development
    - Brownsville Think Tank Matters
    - Spin City Brownsville Plus
- **7,000+ SF green space - rooftop farm/garden**
    - Project Eats
- **3,000 SF One Brooklyn Health System (office)**

- **Design Principles: Sustainability, Trauma Informed Design, Design for Health & Wellness, Active Design, Universal Design**

# PRINCIPLES OF THE NEW NORMAL

## 5 CORE PRINCIPLES OF HEALTHY, EFFICIENT, DURABLE, AND SUSTAINABLE BUILDINGS:

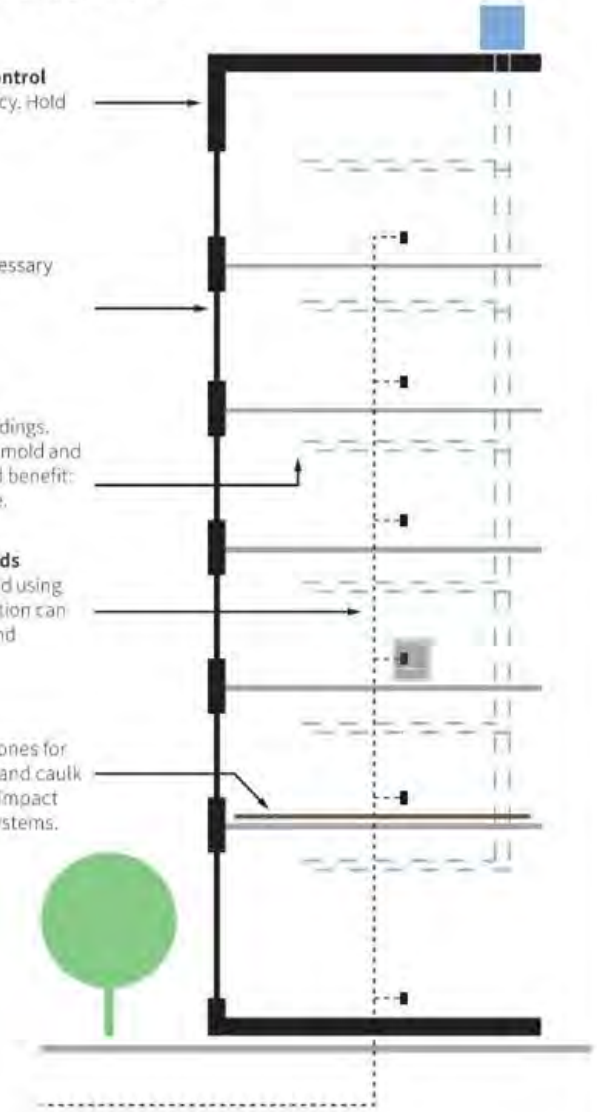
**Continuous, Robust Thermal Control**
Most basic level of energy efficiency. Hold on to the heat you've paid for.

**Air Tightness**
Next level of thermal control. Necessary to truly ensure energy efficiency.

**Energy Recovery Ventilators**
Fresh air is critical for air tight buildings. Without this measure owners risk mold and resident respiratory issues. Added benefit: recovers additional energy for use.

**Efficient Electrification and Loads**
If building an air tight structure and using technologies like ERVs, electrification can be cost effective for developers and healthier for residents.

**Healthy Materials**
There are good choices and bad ones for materials. Everything from paint and caulk to flooring and counter tops can impact the health of residents and ecosystems.



## Vs. CODE MIN

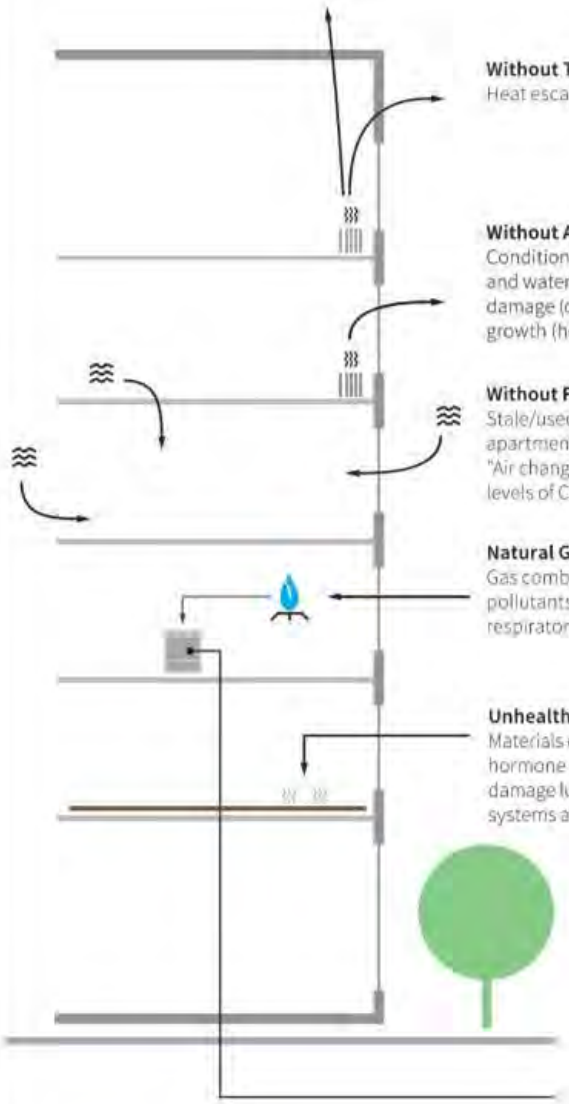
**Without Thermal Control**
Heat escapes through exterior.

**Without Air Sealing**
Conditioned air passes through exterior and water/moisture infiltrates causing damage (durability issues) and mold growth (health issues).

**Without Fresh Air Supply**
Stale/used air pulled from corridors, other apartments and through exterior walls. "Air change" not achieved. Unhealthy levels of $CO_2$ and poor humidity control.

**Natural Gas**
Gas combustion produces a variety of pollutants which can lead to and worsen respiratory diseases.

**Unhealthy Materials**
Materials can leach or off-gas endocrine and hormone disrupting chemicals. They can damage lungs, hearts, nervous and immune systems and increase embodied carbon.



# CURRENT CODE

NON-AIRTIGHT ENCLOSURE + EXHAUST ONLY VENITLATION =

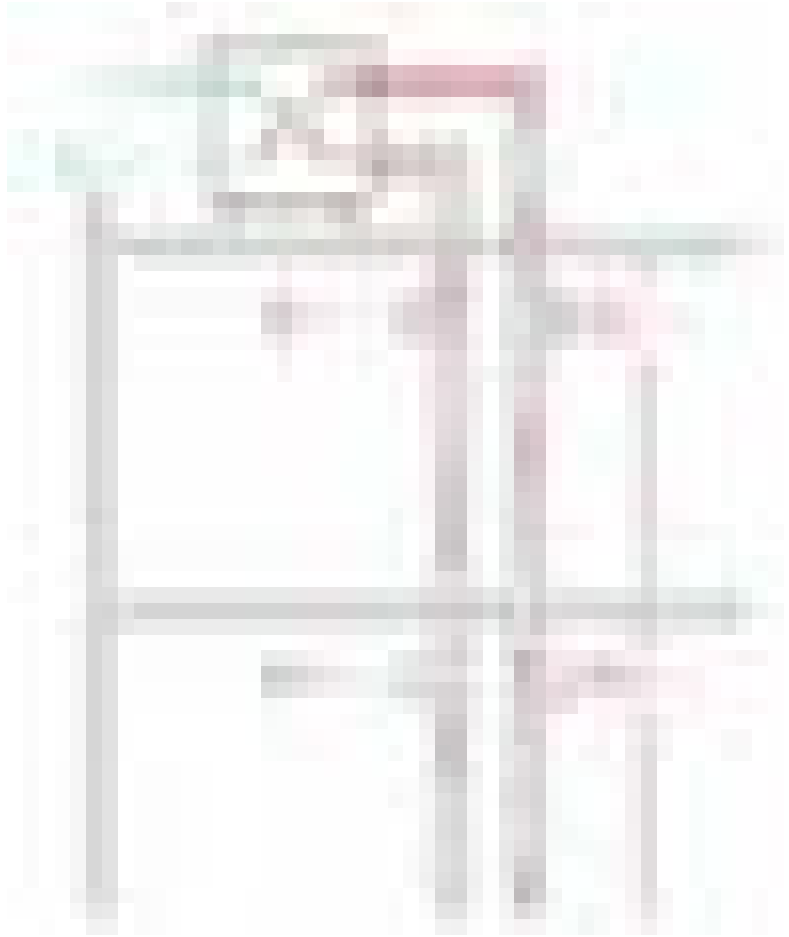
"*FRESH AIR*" FROM LEAKY WALLS!

**IMAGE SOURCE: BUILDING SCIENCE CORP**

# AIRTIGHTNESS + BALANCED VENTILATION

SOURCE: PHIUS

+



SOURCE: BEEX BETTER VENTILATION PLAYBOOK

# THERMAL ENVELOPE

## Triple Pane Windows

- U 0.10 (COG)
- SHGC 0.32
- Window/Wall Ratio:
  - 24% at Residential
  - 35% with Community Facility

## Thermal insulation

- Above Grade Wall R20 (U=0.05)
- Roof R50 (U=0.02)
- Foundation Wall R16 (U=0.06)
- Below grade slab – no insulation

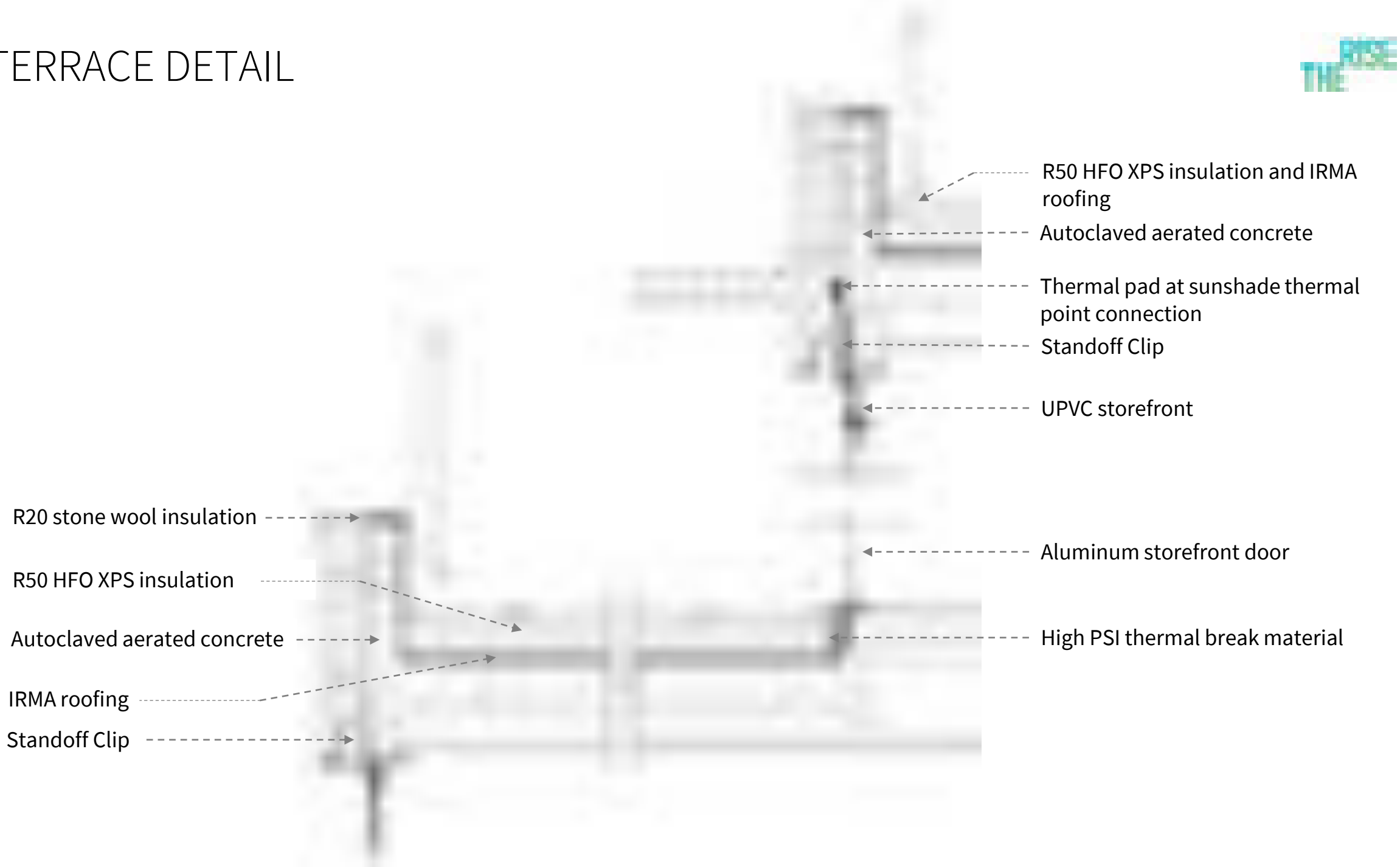
## Thermal bridges

- Thermal pads
- Aerated concrete block
- Stand off clips

## Air sealing

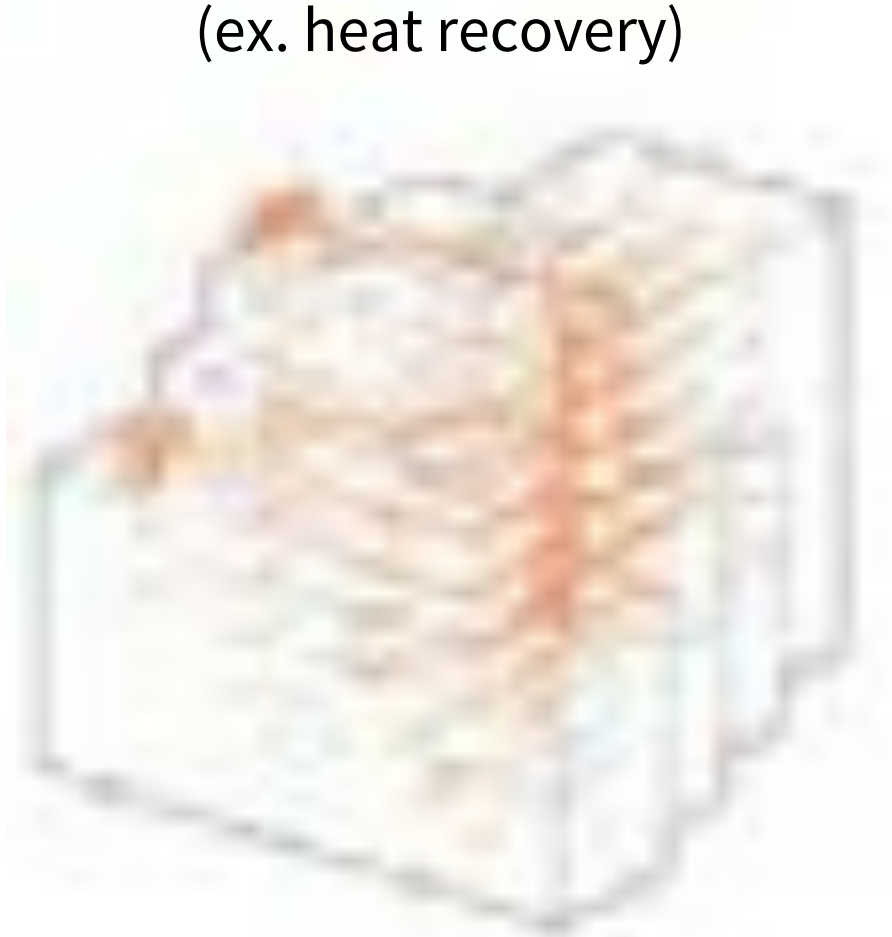
- 0.033 cfm/sf enclosure

# TERRACE DETAIL



## HVAC/REFRIGERANT MANAGEMENT

HORIZONTAL DISTRIBUTION
(ex. heat recovery)



19,500 LF (5,749,000 kgCO2e)

VERTICAL DISTRIBUTION

9,500 LF (2,800,000 kgCO2e)

# MATERIALS/EMBODIED CARBON

## Locally produced as much as possible

- Aggregate for concrete

## Recycled content as much as possible

- Gypsum – Recycled content info
- Structural Steel – avg 25% Recycled Content

## Construction waste management

- Min. 75% diversion rate

## Alternate Materials

- Stone wool and in lieu of typical XPS insulation
- Reduce the cement in concrete, CMU and precast plank: Increase curing time, Alternate SCMs (Slag)

## Material Transparency

- Calling for EPD in specs

# INDOOR ENVIRONMENTAL QUALITY

## Ventilation

- ERV – balanced filtered fresh air

## Contaminant control

- No interior combustion
- Smoke free building
- Walk off mats at entrances
- Apartment Compartmentation

## Healthy Materials

- No/Low VOC
- Floorscore or Green Guard finishes
- Calling for HPD in specs
- Solid surface
- Simplified material palette

# INTERIOR

RESIDENTIAL ENTRY LOBBY

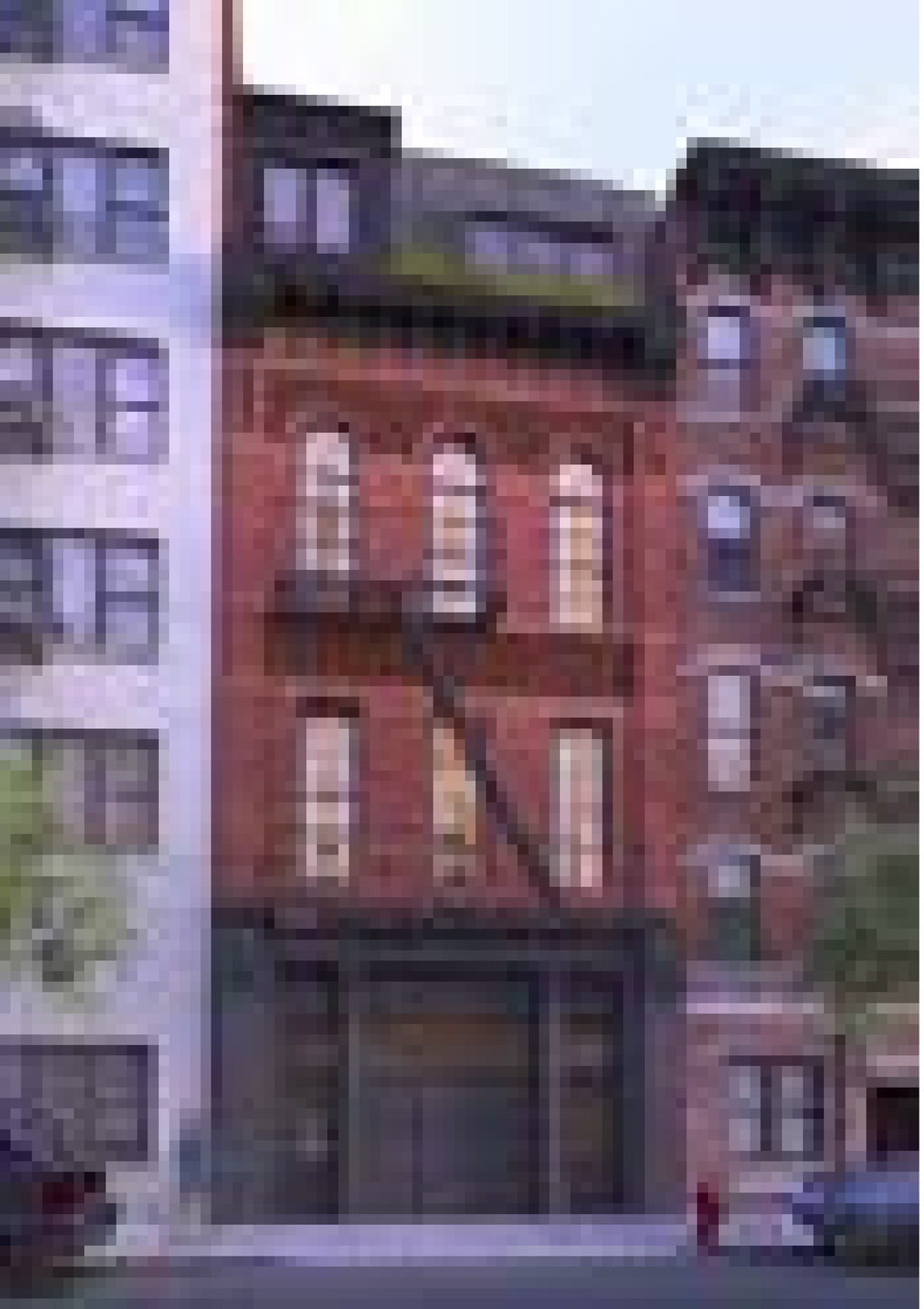
COMMUNITY ROOM AT TERRACE

# PERFORMANCE

## SOURCE ENERGY USE INTENSITY (EUI)

(w/o renewables)

| | |
|---|---|
| Goals for Building As Proposed: | **21.26** kBtu/sf/yr |
| | 1.80 kgCO2/sf |
| | SITE EUI: 17.25 kBtu/sf |
| Avg NYC Multifamily Bldg: | 112 kBtu/sf/yr |
| Code Building (2020): | 90 kBtu/sf/yr |
| PHIUS Primary Energy: | Approx 34 kBtu/sf/yr |
| PHI Primary Energy: | Approx 23.3 kBtu/sf/yr |
| LL97- 2024 limit: | 6.75 kgCO2/sf |
| LL97- 2030 limit: | 4.07 kgCO2/sf |
| **Certification Goal:** | PHI |



# ENGINE 16

## 223 EAST 25TH STREET
## MANHATTAN, NY
## Passive Firehouse Retrofit

BAXT | INGUI
Architects PC

TEAM

MICHAEL INGUI, AMY FAILLA, JOEY CHEMELLO, ASHLEY GRIFFITH, Baxt Ingui Architects
R SUTTON & CO., General Contractor
KEVIN BRENNAN, Brennan & Brennan Air Sealing
ROBERT DIVILIO, RJD ENGINEERING, Mechanical
ED MAY AND JOHN MITCHELL, BLDTYP, Passive House Consultants

# COMPLETED PASSIVE PROJECTS

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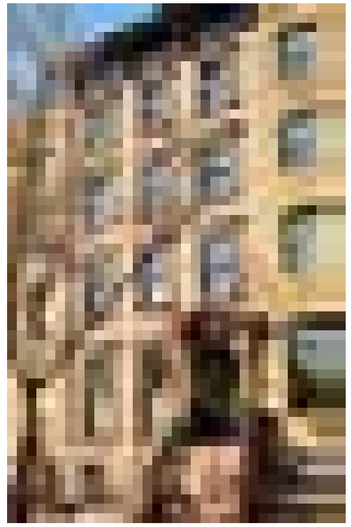
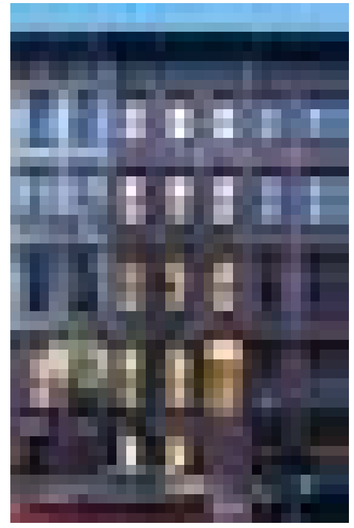
BROOKLYN HEIGHTS,
BROOKLYN NYC

CARROLL GARDENS,
BROOKLYN NYC



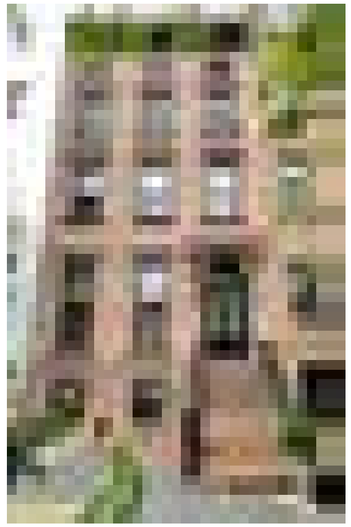
BROOKLYN HEIGHTS,
BROOKLYN NYC

BROOKLYN HEIGHTS,
BROOKLYN NYC



UPPER WEST SIDE,
MANHATTAN NYC

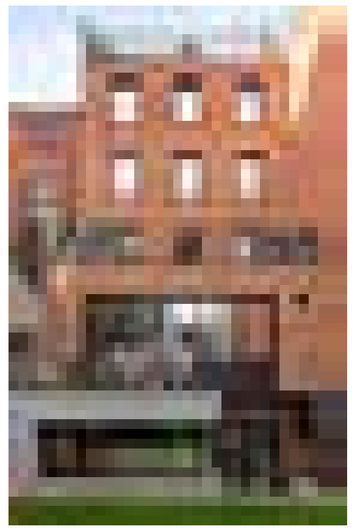
UPPER WEST SIDE,
MANHATTAN NYC



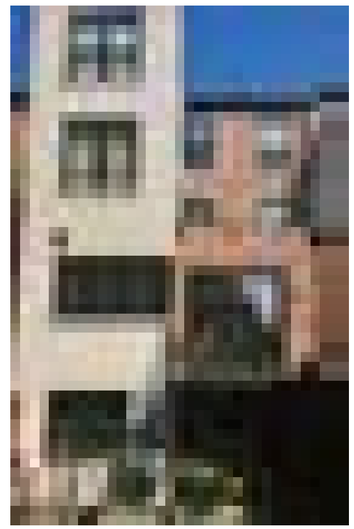
CARROLL GARDENS,
BROOKLYN NYC

BROOKLYN HEIGHTS,
BROOKLYN NYC

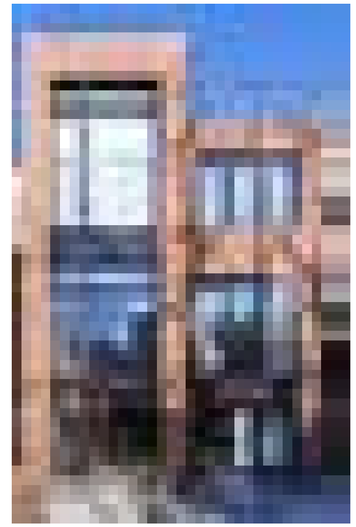
BROOKLYN HEIGHTS,
BROOKLYN NYC



BROOKLYN HEIGHTS,
BROOKLYN NYC



COBBLE HILL,
BROOKLYN NYC



CARROLL GARDENS,
BROOKLYN NYC

# A SYSTEMATIC APPROACH TO COST-EFFECTIVE CARBON NEUTRAL BUILDINGS

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## BAXT INGUI'S SYSTEMATIC APPROACH INCLUDES THESE CRITICAL STEPS:

1. Educating the client on passive house in an effective way.
2. Involving the passive house consultant before or during schematic design.
3. Start the certification process with your certification body early and harness their feedback as early as possible.
4. Select and involve a contractor as early as possible, and get them and their team certified/trained.
5. Hold weekly meetings.
6. Use the blower door as a tool.
7. Openly share knowledge & receive feedback with the community.

SCHEMATIC DESIGN PHASE ENERGY MODEL OF SUMMER PERIOD WINDOW NET ENERGY BALANCE. COURTESY OF BLDGTYP, LLC.

# COLLABORATIVE PROCESS + EDUCATIONAL EVENTS

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# NYSERDA BUILDINGS OF EXCELLENCE

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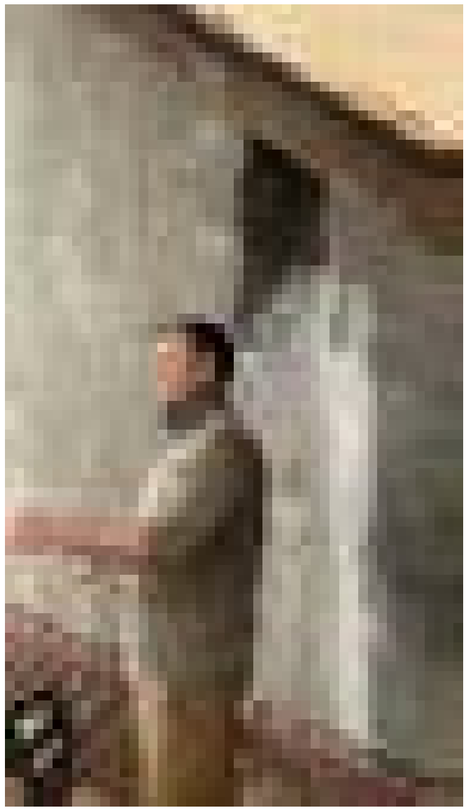

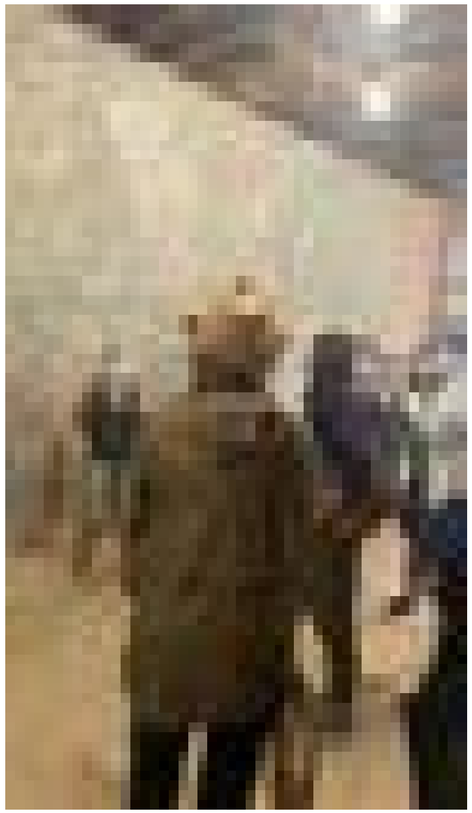

IMAGES FROM THE CONSTRUCTION SITE VISIT OF ENGINE 16 AT THE 2021 NAPHN CONFERENCE ON JUNE 12TH, 2021.

1. NYSERDA Buildings of Excellence has given us a platform to increase our efforts to share information on our Passive House process.
2. The program was right for our clients because it provided the support they needed to complete their project and achieve their goal of spreading Passive House.

# ENGINE 16

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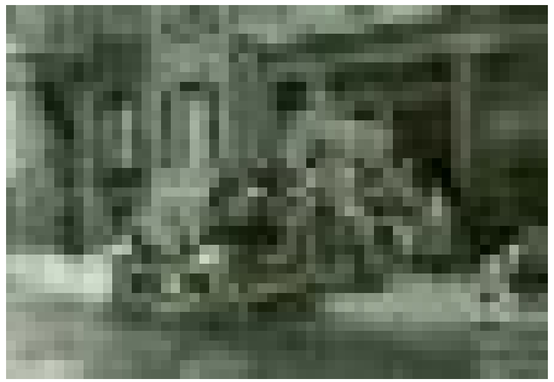
Architects PC

1.

2.



3.

1. PHOTO: CIRCA 1950
2. PHOTO: CIRCA 1925
3. RENDERING; PROPOSED FRONT FACADE
   *CREDIT: PERSPECTIVE ARTS*

# SITE PLAN + CONTEXT

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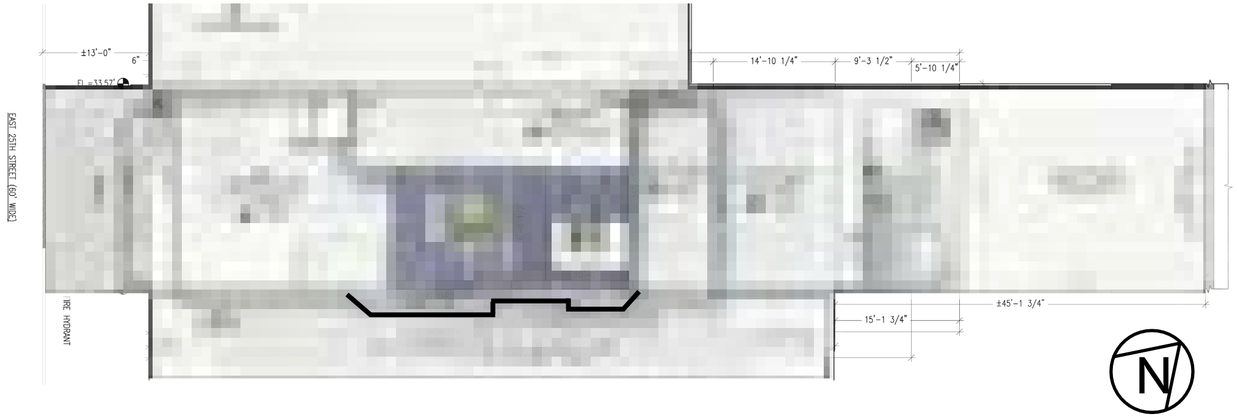


1.


2.

3.

1" = 200'

## NOTES

1. PLOT PLAN *(PROPOSED)*
2. SITE PLAN/ CONTEXT
3.PHOTO: SIDE ELEVATION

## LEGEND

223 E. 25TH

SUBWAY STOP

BUS STOP

CITIBIKE STOP

RESTAURANT/BAR/ENTERTAINMENT *(WITHIN HIGHLIGHTED AREA)*

PARK

PUBLIC FACILITIES + INSTITUTIONS *(INCLUDING NYU, BARUCH COLLEGE, SVA)*

# FRONT FACADE ELEVATIONS

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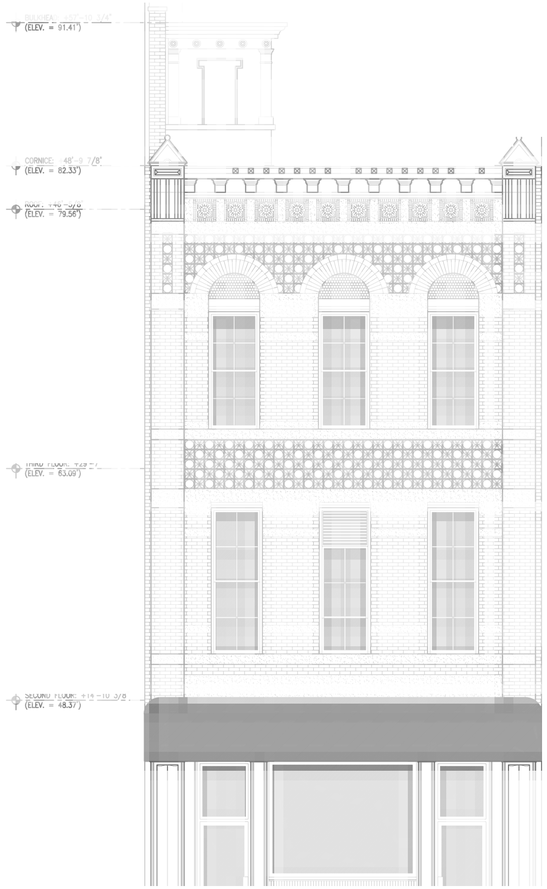
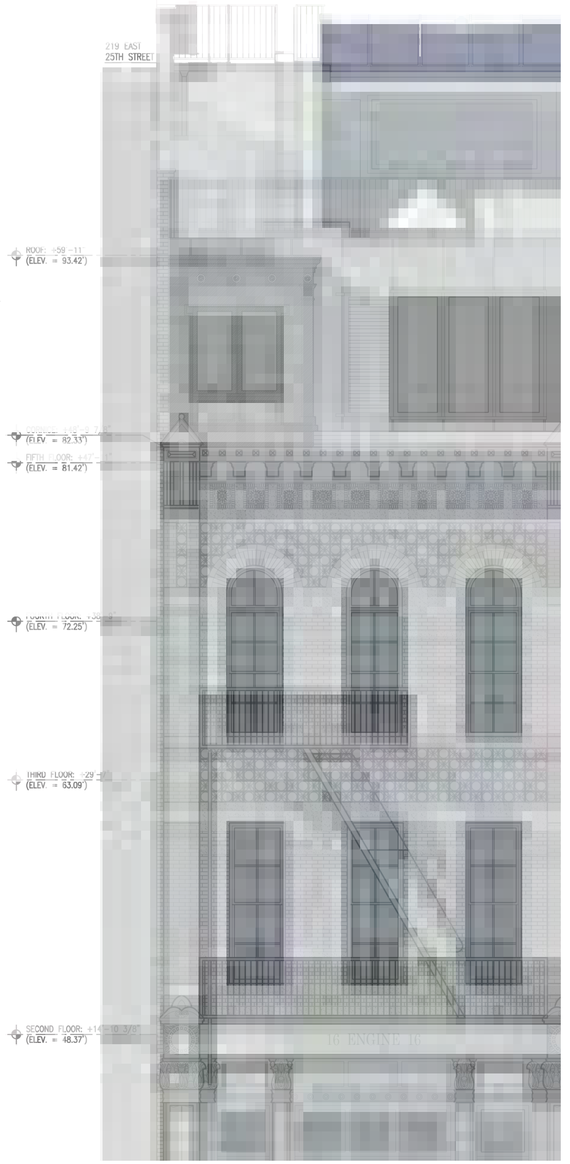
- Decommissioned firehouse building, converted into a church in 1974.
- Ground floor was used for religious facilities while upper floors fell into disrepair.
- New owners purchased in 2018.
- Adaptive reuse project as a 4-family residence with a community facility on the ground floor.

1.




2.




3.

1. PHOTO: EXISTING FRONT FACADE (*SOUTH FACING*)
2. ELEVATION: EXISTING FRONT FACADE (*SOUTH FACING*)
3. ELEVATION: PROPOSED FRONT FACADE (*SOUTH FACING*)

# REAR FACADE ELEVATIONS

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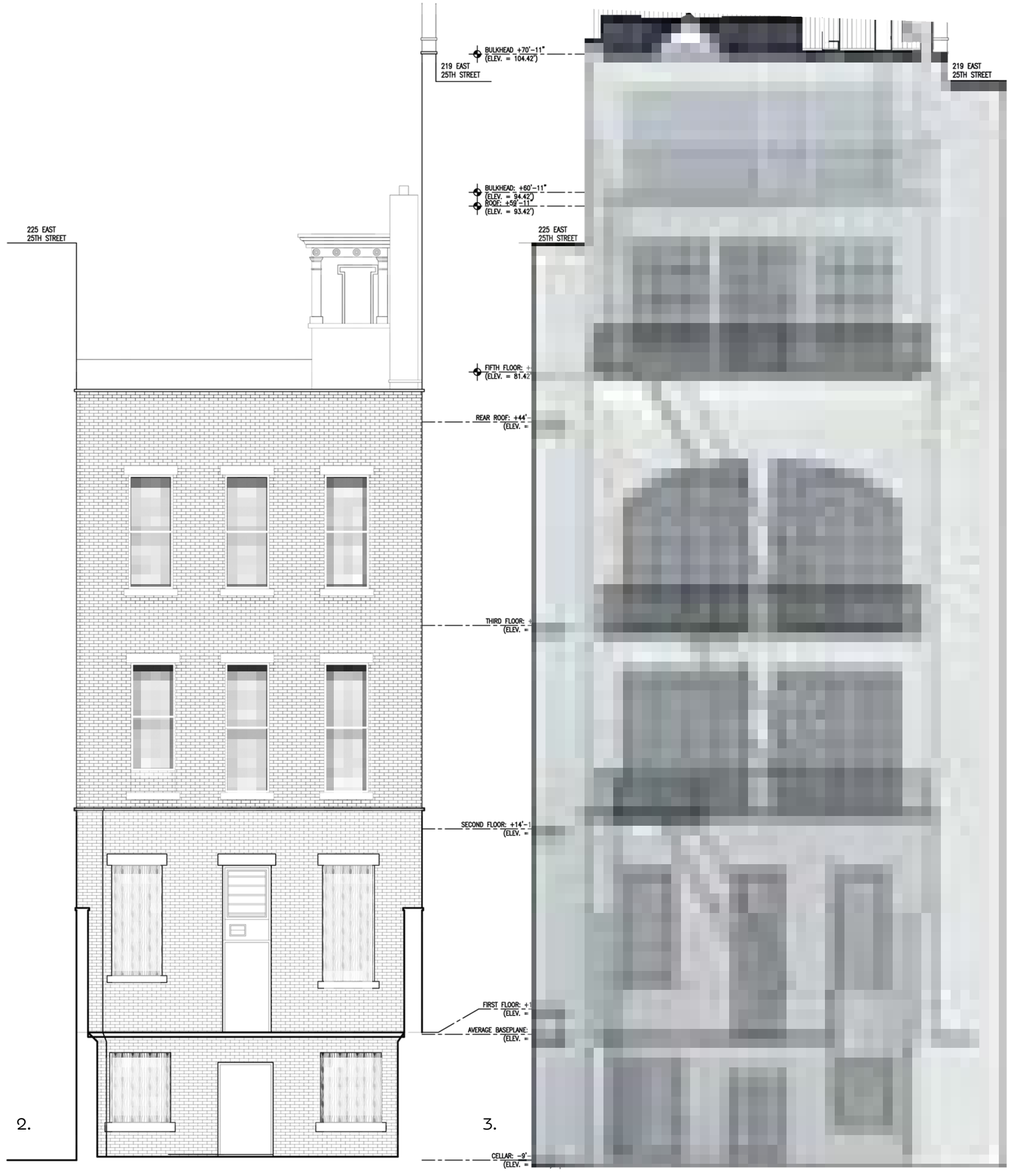
1.

2.




3.

1. PHOTOS: EXISTING REAR FACADE (*NORTH FACING*)
2. ELEVATION: EXISTING REAR FACADE (*NORTH FACING*)
3. ELEVATION: PROPOSED REAR FACADE (*NORTH FACING*)

# HISTORIC + RESTORED ELEMENTS

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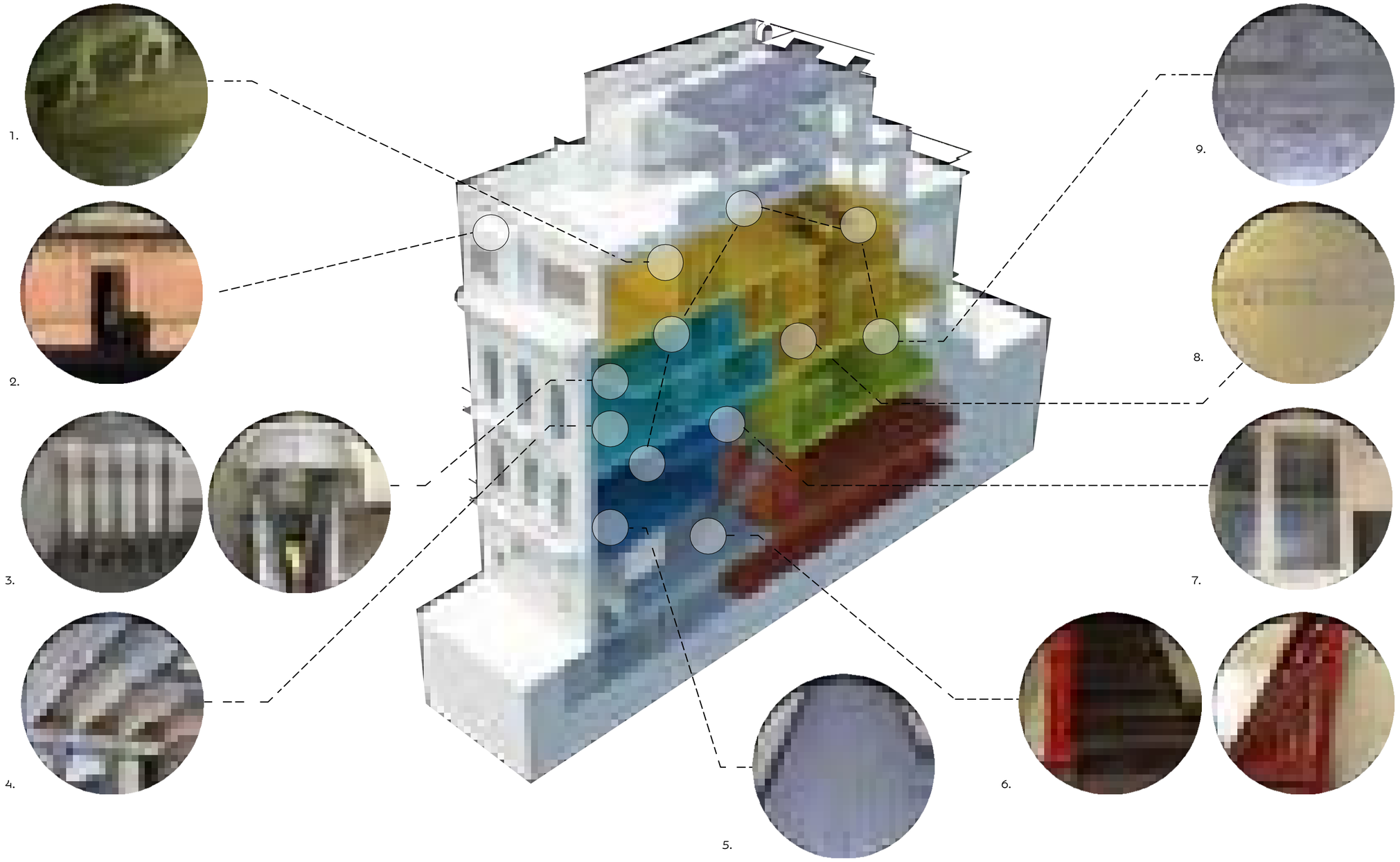


1. HISTORIC FIREHOUSE HOSE HOOKS
2. FRONT ADDITION EMULATES HISTORIC CAST IRON
3. HISTORIC WOOD RAILINGS
4. REPURPOSED WOOD FLOOR JOISTS
5. RESTORED WOOD FLOORING
6. HISTORIC STEEL RAILING
7. HISTORIC WINDOWS
8. HISTORIC FIREHOUSE HOOKS
9. RESTORED TIN CEILINGS

ENGINE 16 | 223 E. 25TH

# EXISTING CONDITIONS: FAÇADE DETAILS

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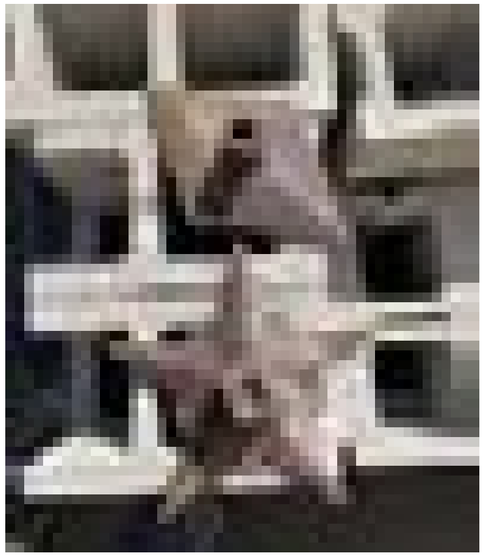



# EXISTING CONDITIONS: ADAPT + REUSE

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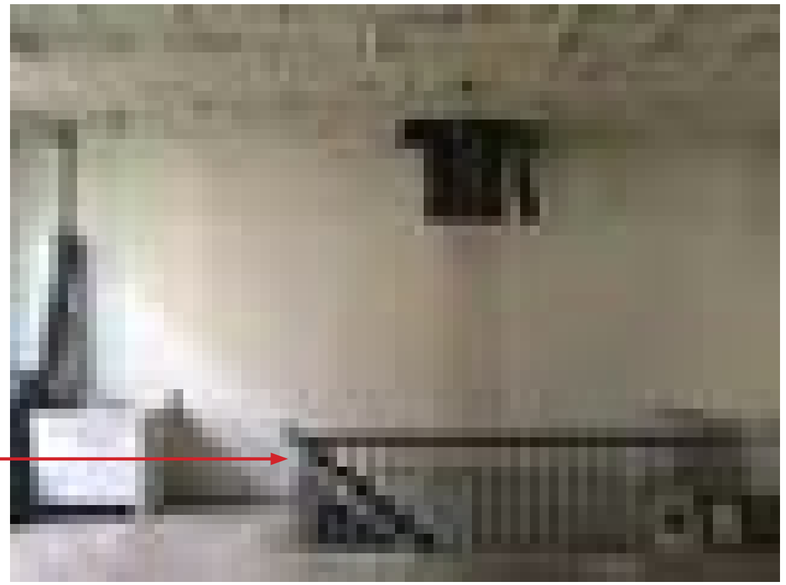
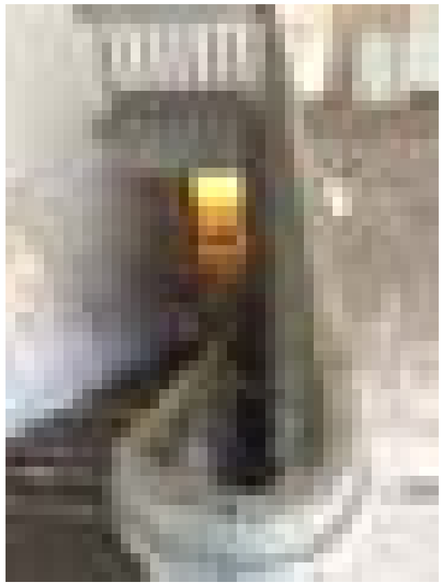
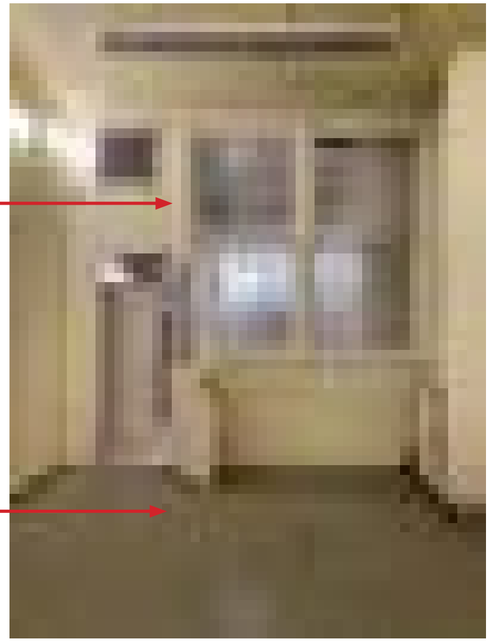
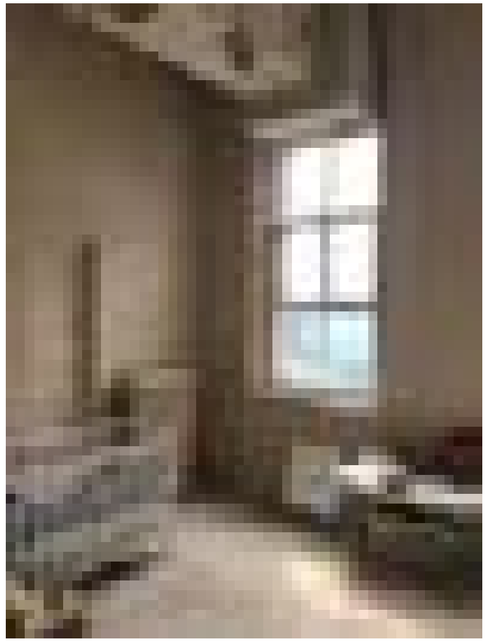




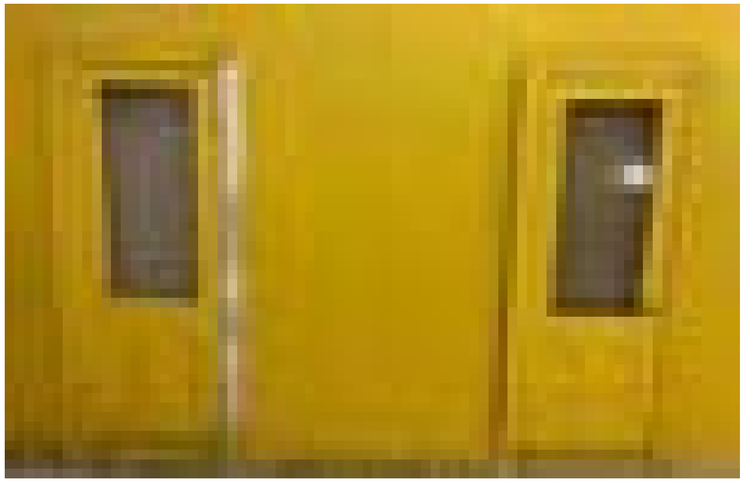




1. EXISTING 2ND-3RD FLOOR STAIRCASE
2. WINDOWS AND DOORS TO BE REUSED
3. EXISTING WOOD FLOORING, PRIOR TO SANDING

# PROGRESS PHOTOS: UNCOVERING + RESTORING

BAXT INGUI Architects PC



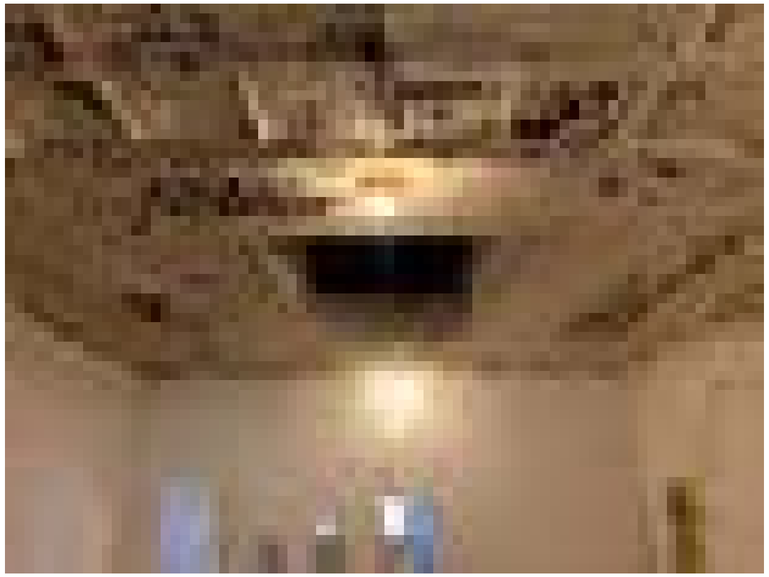
1.

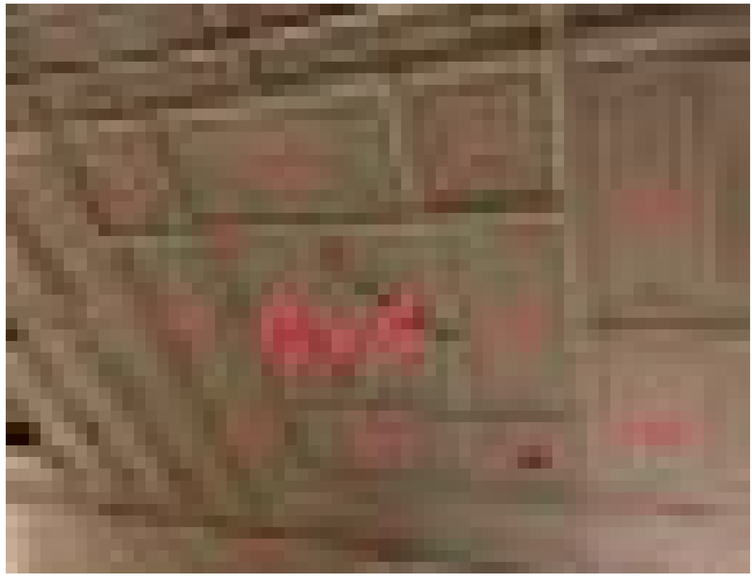
2.

1. FIRE COAT HOOKS
2. FLOORS AFTER SANDING

# EXISTING + PROGRESS PHOTOS: TIN CEILINGS

BAXT | INGUI
Architects PC





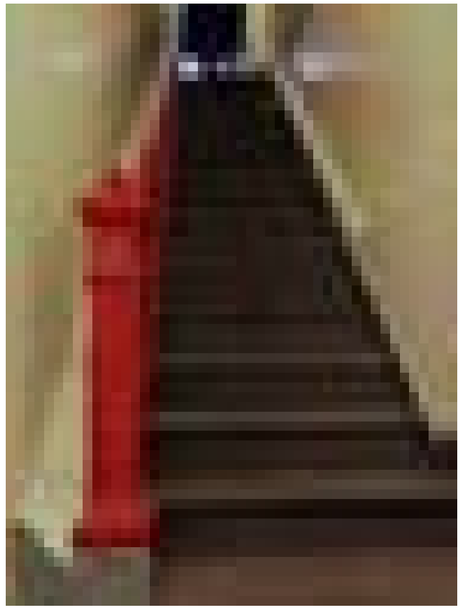
# PASSIVE DETAIL: FIRST FLOOR GARAGE

BAXT | INGUI
Architects PC

# SKETCHES: ORIGINAL ENTRY STAIR

BAXT INGUI Architects PC

1.



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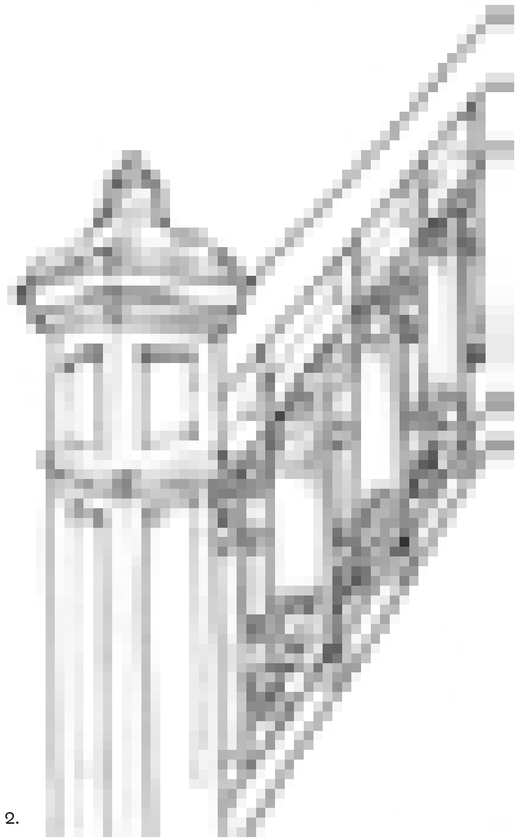
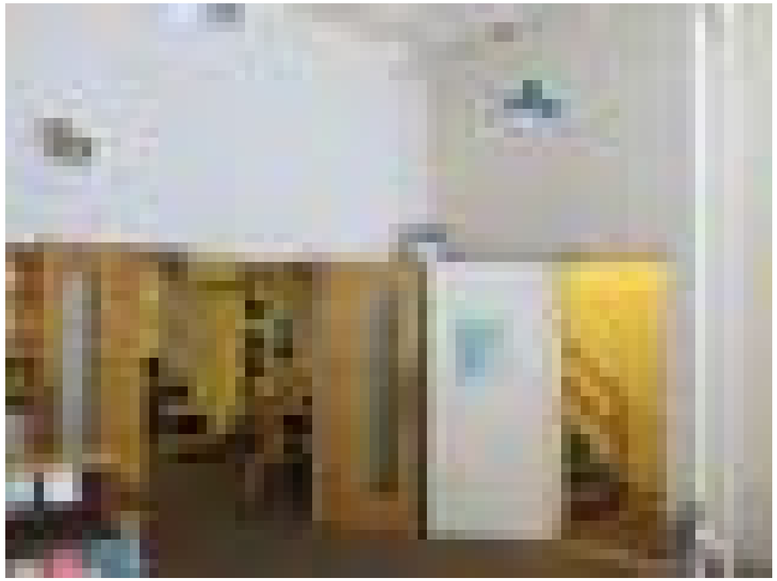


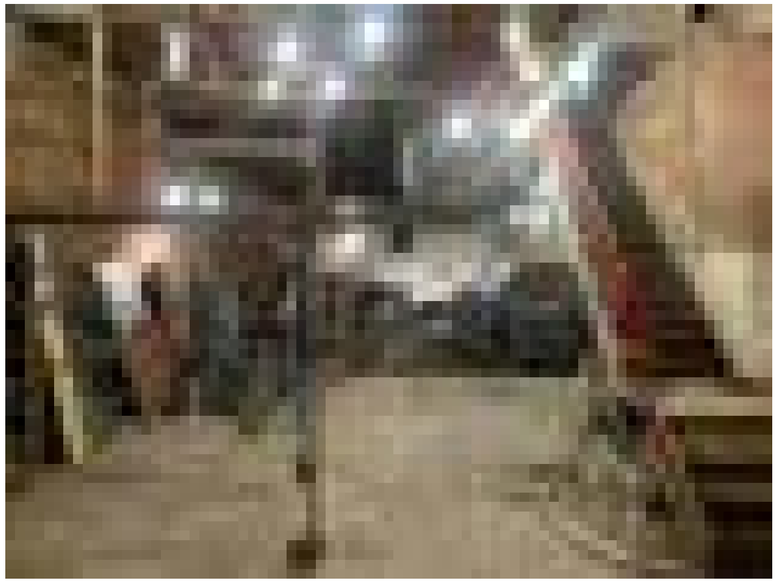
3.

1. PHOTO: EXISTING STEEL RAILING AT ENTRY
2. SKETCH: RESTORED STEEL RAILING
3. PROPOSED ENTRY STAIR WITH RESTORED RAILINGS

# PROGRESS PHOTOS: ORIGINAL ENTRY STAIR

BAXT INGUI
Architects PC

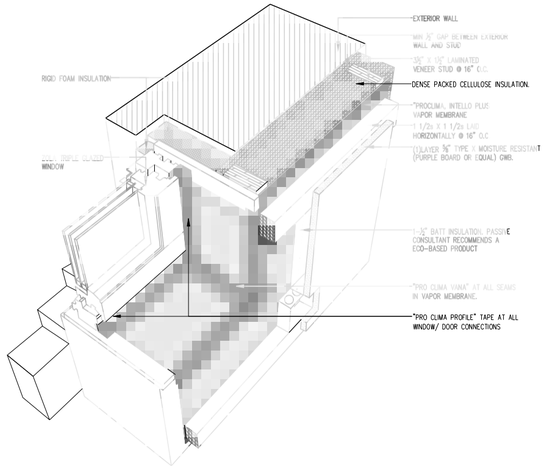




# WINDOW DETAILS

BAXT | INGUI Architects PC

1.

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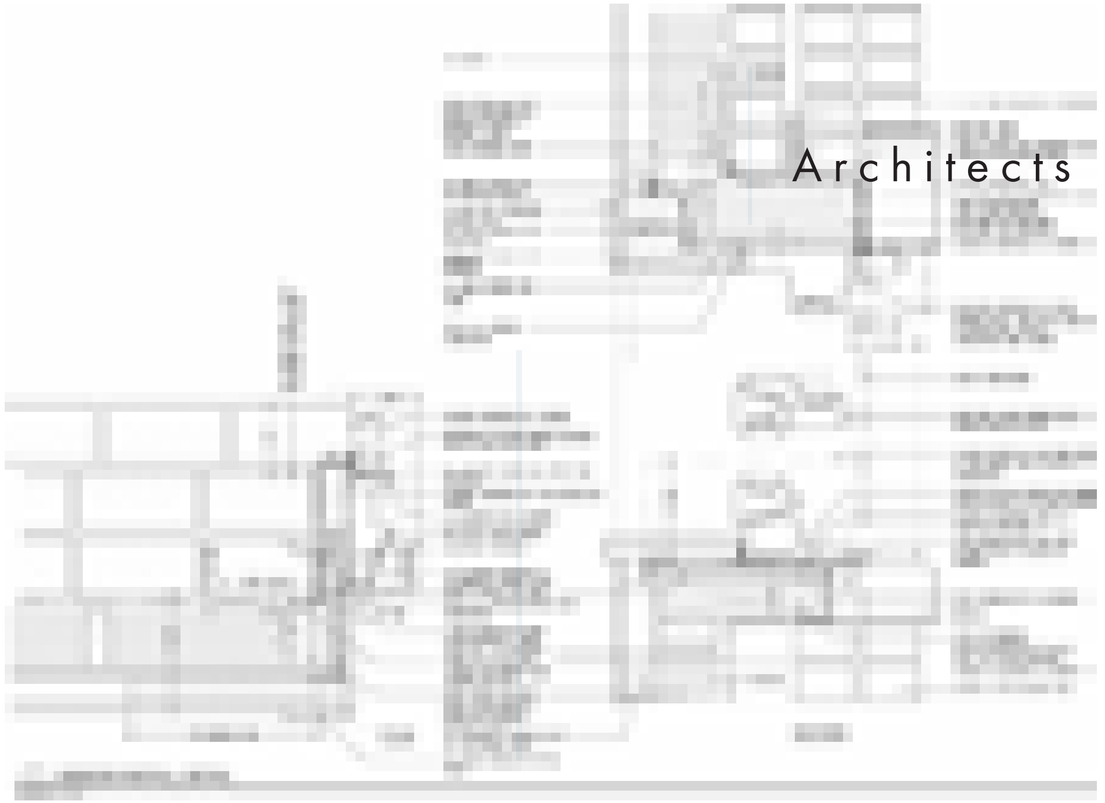



3.

4.

5.

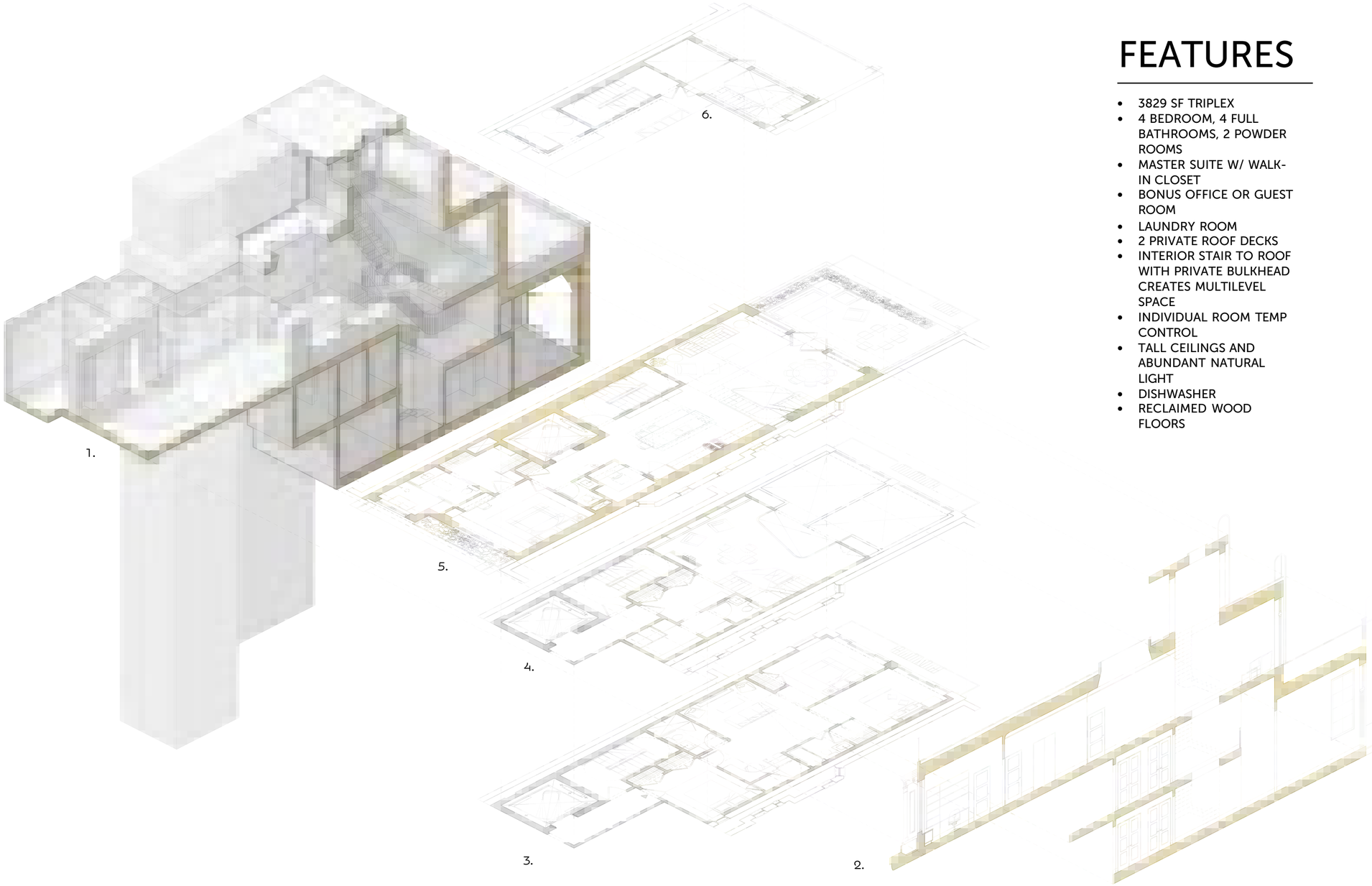
6.

7.

1. WINDOW INSTALL DETAIL: AXON
2. WINDOW INSTALL DETAIL: PLAN + SECTION
3. WINDOW JAMB (FIXED) THERMAL ANALYSIS
4. WINDOW JAMB (OPERABLE) THERMAL ANALYSIS
5. WINDOW HEAD THERMAL ANALYSIS
6. WINDOW SILL THERMAL ANALYSIS
7. PHOTO: WINDOW WELLS PREPPED FOR INSTALL

# UNIT 4 TRIPLEX

BAXT | INGUI
Architects PC




## FEATURES

- 3829 SF TRIPLEX
- 4 BEDROOM, 4 FULL BATHROOMS, 2 POWDER ROOMS
- MASTER SUITE W/ WALK-IN CLOSET
- BONUS OFFICE OR GUEST ROOM
- LAUNDRY ROOM
- 2 PRIVATE ROOF DECKS
- INTERIOR STAIR TO ROOF WITH PRIVATE BULKHEAD CREATES MULTILEVEL SPACE
- INDIVIDUAL ROOM TEMP CONTROL
- TALL CEILINGS AND ABUNDANT NATURAL LIGHT
- DISHWASHER
- RECLAIMED WOOD FLOORS

## NOTES

1. AXON
2. SECTION
3. THIRD FLOOR PLAN
4. FOURTH FLOOR PLAN
5. FIFTH FLOOR PLAN
6. SIXTH FLOOR PLAN AND ROOF

# PUBLIC + PRIVATE EXTERIOR SPACES

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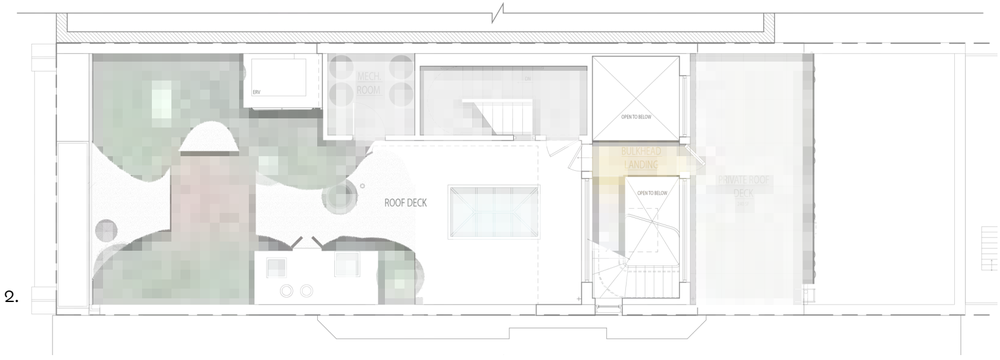
Architects PC

1.

2.

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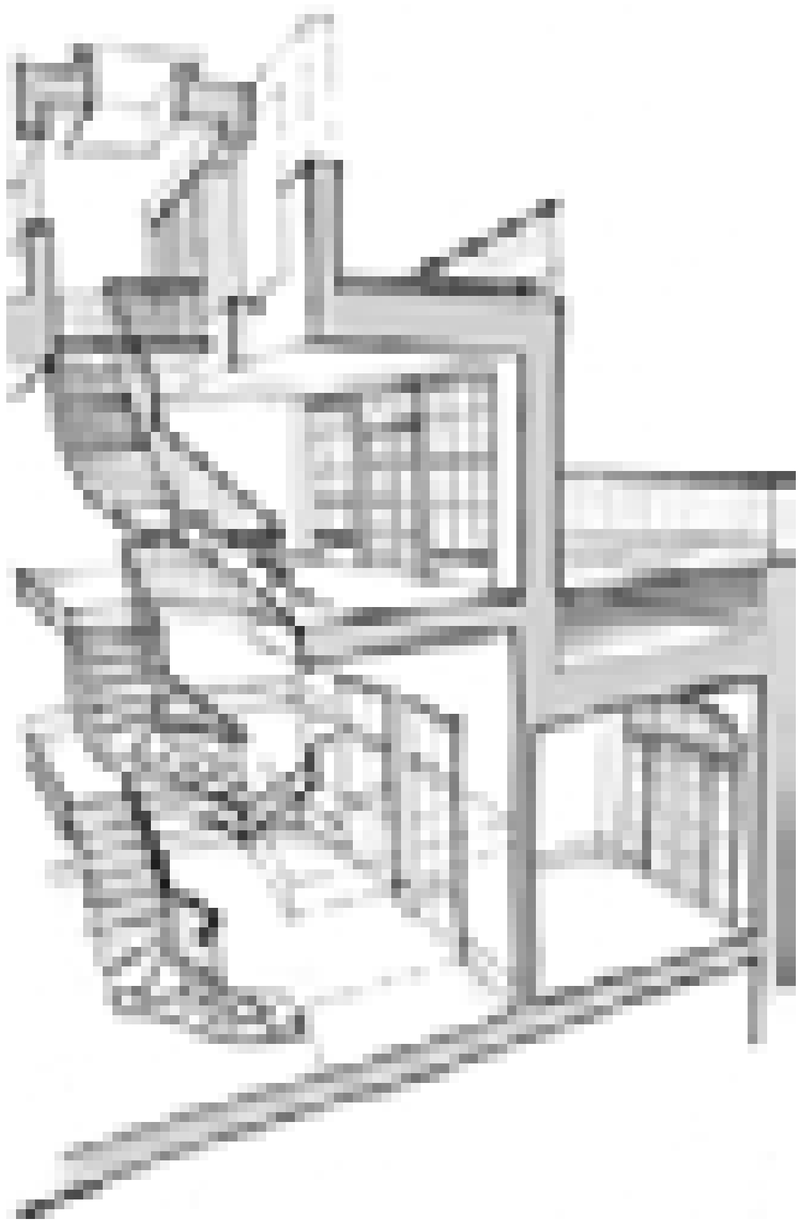


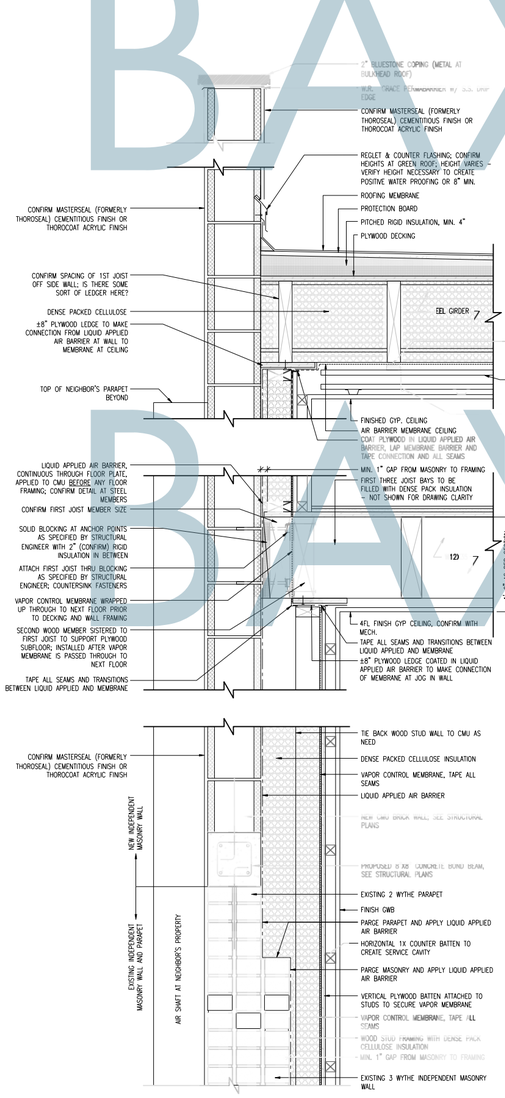
1. ROOF KEY PLAN
2. FRONT ROOF DECK RENDERING
3. UNIT 4 STAIR SKETCH

N

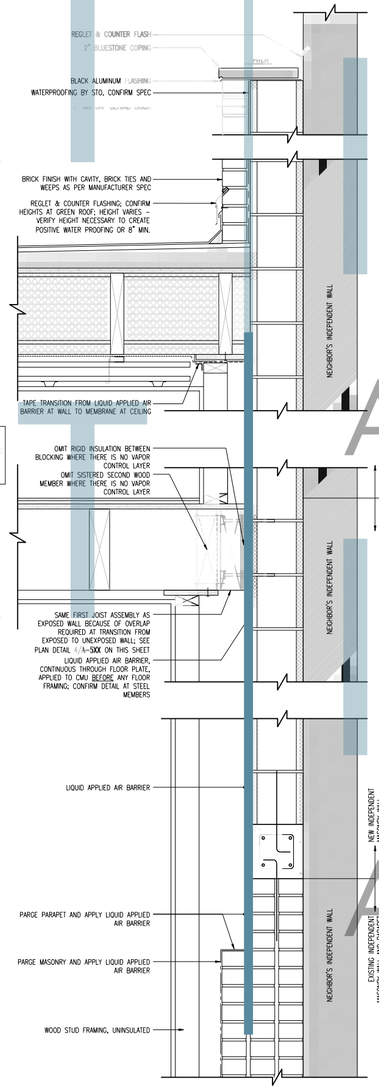
ENGINE 16 | 223 E. 25TH

# WALL + ROOF DETAILS

BAXT | INGUI
Architects PC



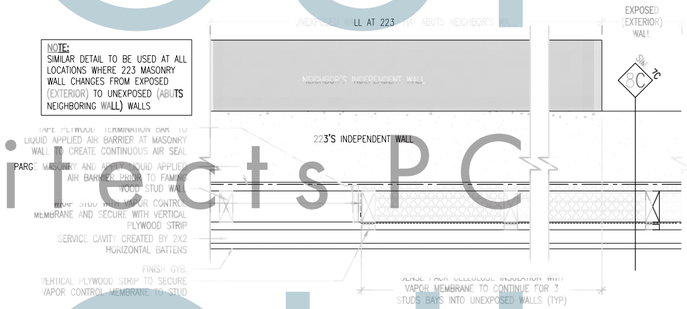

1 EXPOSED SIDE WALL DETAIL
SCALE: 1 1/2" = 1'-0"



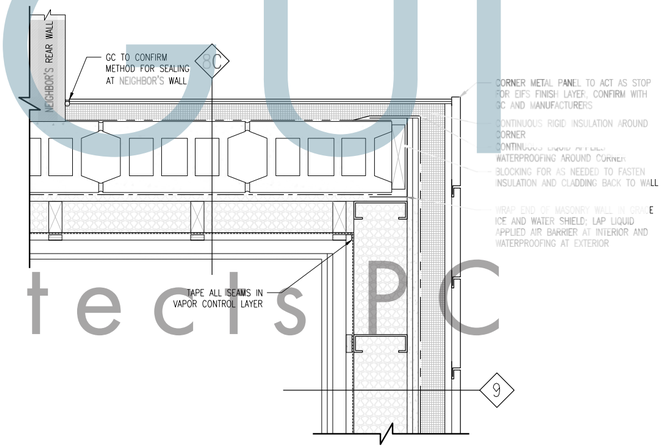

2 UNEXPOSED SIDE WALL DETAIL
SCALE: 1 1/2" = 1'-0"

| SPEC LEGEND AND SCHEDULE | | |
|---|---|---|
| AIR BARRIER AT WALLS | PRO CLIMA VISCONN WHITE, FLUID APPLIED | —— - —— - —— |
| AIR BARRIER AT ROOF | PRO CLIMA INTELLO MEMBRANE | ---------- |
| VAPOR CONTROL MEMBRANE AT WALLS | PRO CLIMA INTELLO MEMBRANE | ---------- |
| TAPE | PRO CLIMA TESCON VANA TAPE | —— |
| STO RAPID SEAL??? | PRO CLIMA ORCON F | —— |
| WATERPROOFING:???? | STO? | —— — — —— |

NOTE:
SIMILAR DETAIL TO BE USED AT ALL LOCATIONS WHERE 223 MASONRY WALL CHANGES FROM EXPOSED (EXTERIOR) TO UNEXPOSED (ABUTS NEIGHBORING WALL) WALLS



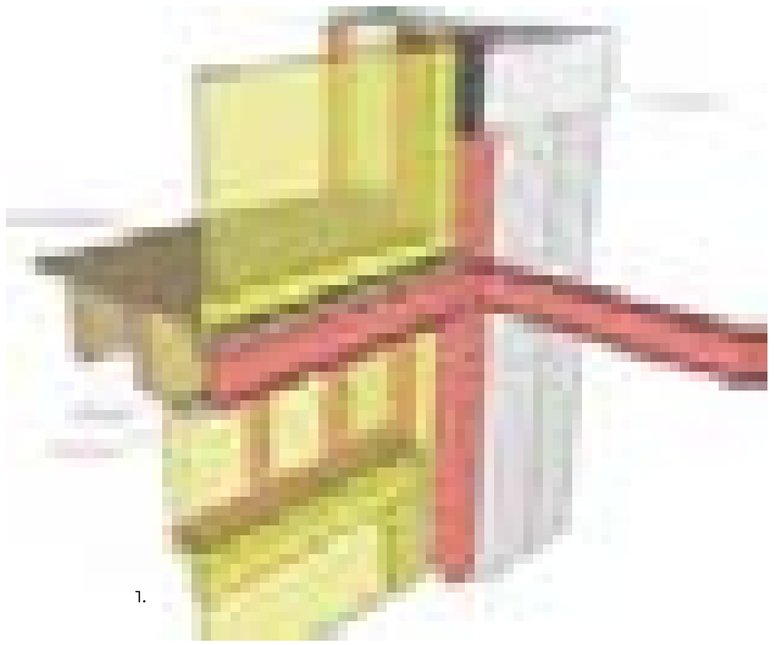

4 TYP PLAN DETAIL AT TRANSITION FROM EXPOSED TO UNEXPOSED WALL
SCALE: 1 1/2" = 1'-0"



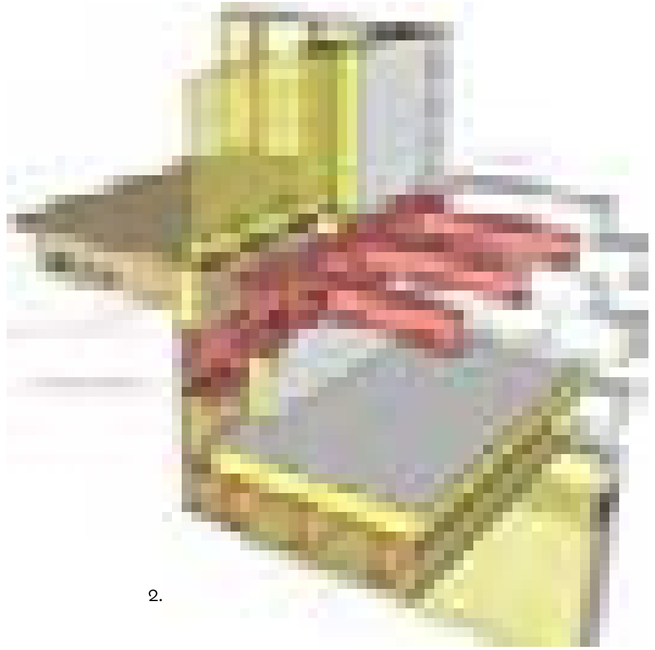

5 PLAN DETAIL AT TRANSITION FROM EIFS TO METAL CLADDING
SCALE: 1 1/2" = 1'-0"

# WALL AND ROOF DETAILS

BAXT INGUI Architects PC



1.



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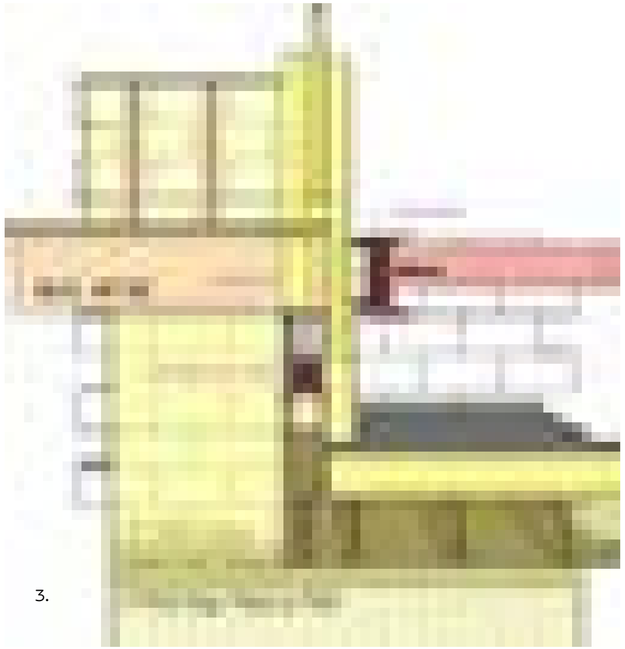


3.

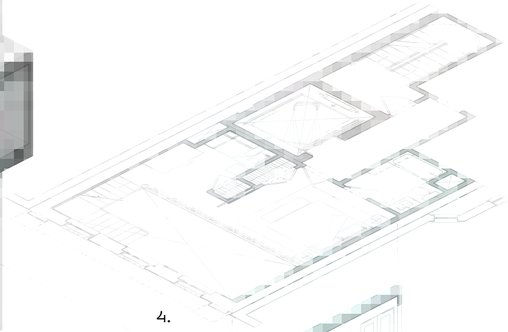
1. THIRD FLOOR THRESHOLD THERMAL BRIDGE ANALYSIS
2. FIFTH FLOOR THRESHOLD THERMAL BRIDGE ANALYSIS
3. FIFTH FLOOR THRESHOLD THERMAL BRIDGE ANALYSIS

THERMAL BRIDGE ANALYSIS COURTESY OF ED MAY AT BLDGTYP, LLC

# UNIT 3 DUPLEX

BAXT | INGUI Architects PC

1.



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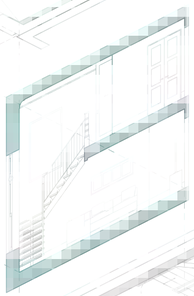

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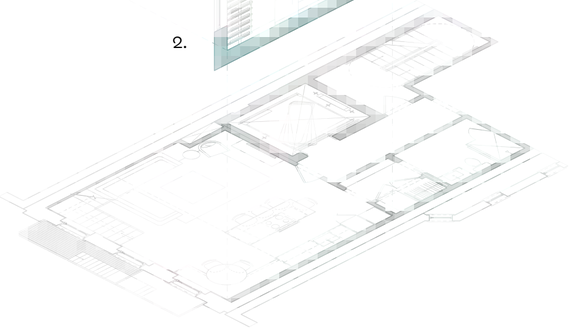


3.

## FEATURES

- 1165 SF DUPLEX
- 1 BEDRROM, 2 BATH
- DOUBLE-HEIGHT SPACE WITH BONUS MESSANINE SPACE
- LAUNDRY CLOSET
- INDIVIDUAL ROOM TEMPERATURE CONTROL
- 13' TALL CEILINGS
- LARGE WINDOWS, ABUNDANT NATURAL LIGHT
- DISHWASHER
- RECLAIMED WOOD FLOORS

5.

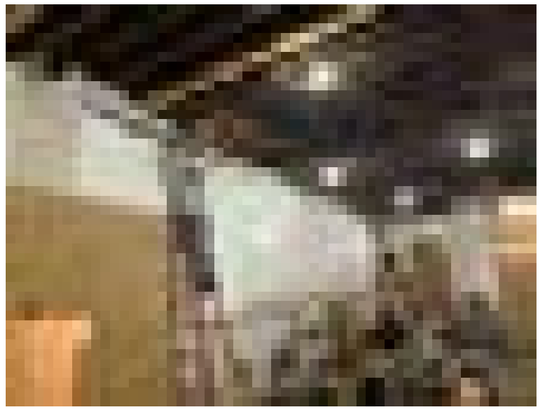
6.

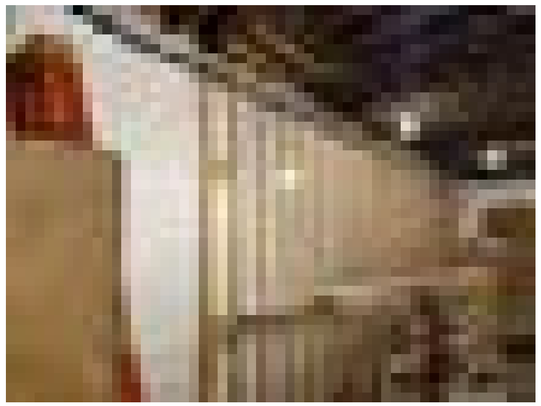
## NOTES

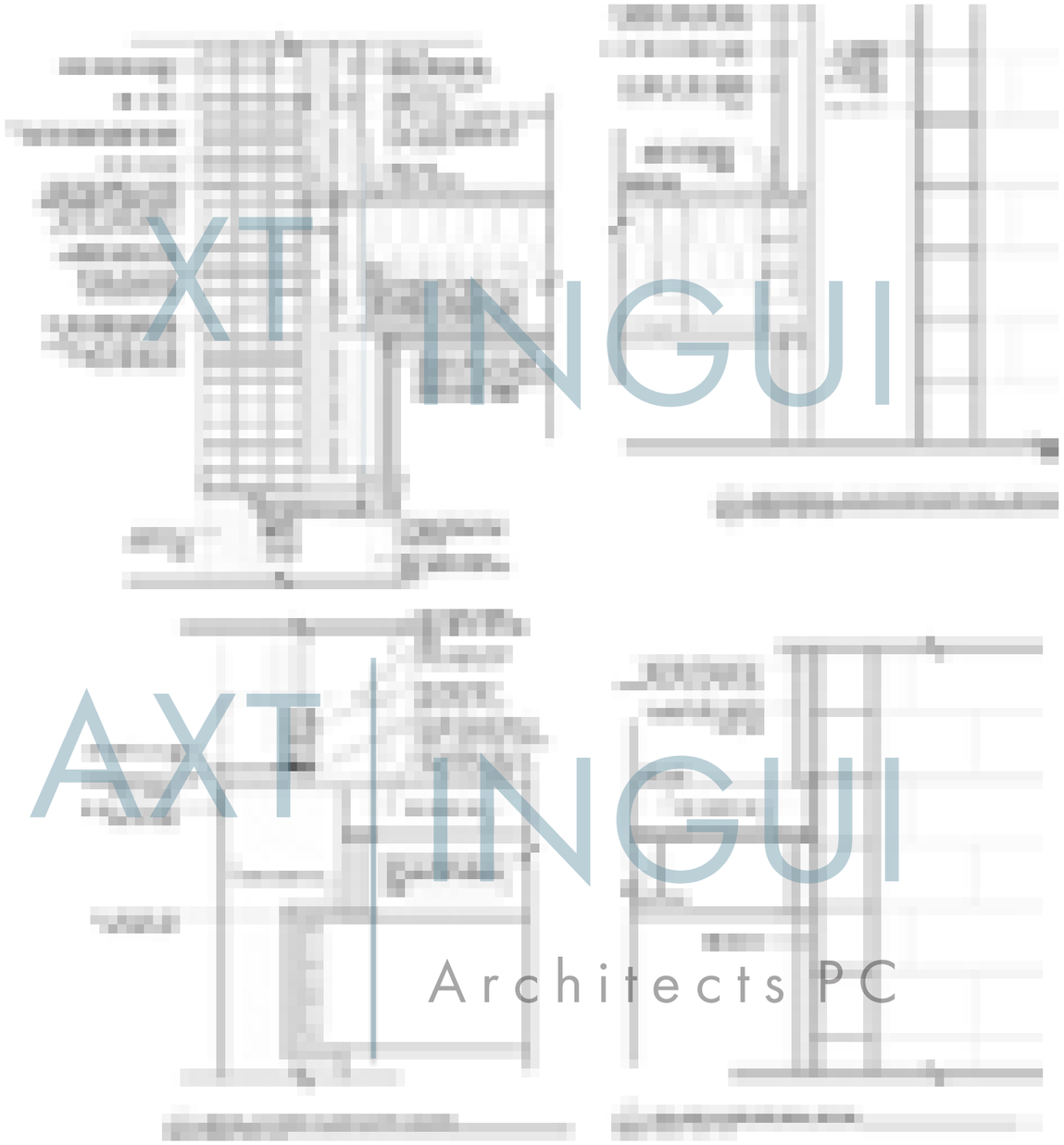
1. AXON
2. SECTION
3. THIRD FLOOR PLAN
4. FOURTH FLOOR PLAN
5. RENDERING: STAIR AND LOFT SPACE
6. PHOTO: UNIT 3 SITE PROGRESS

# RETROFIT AIR SEALING DETAILS

BAXT INGUI Architects PC







# CELLAR + 1ST FLOOR PLANS: COMMUNITY SPACE

BAXT INGUI Architects PC

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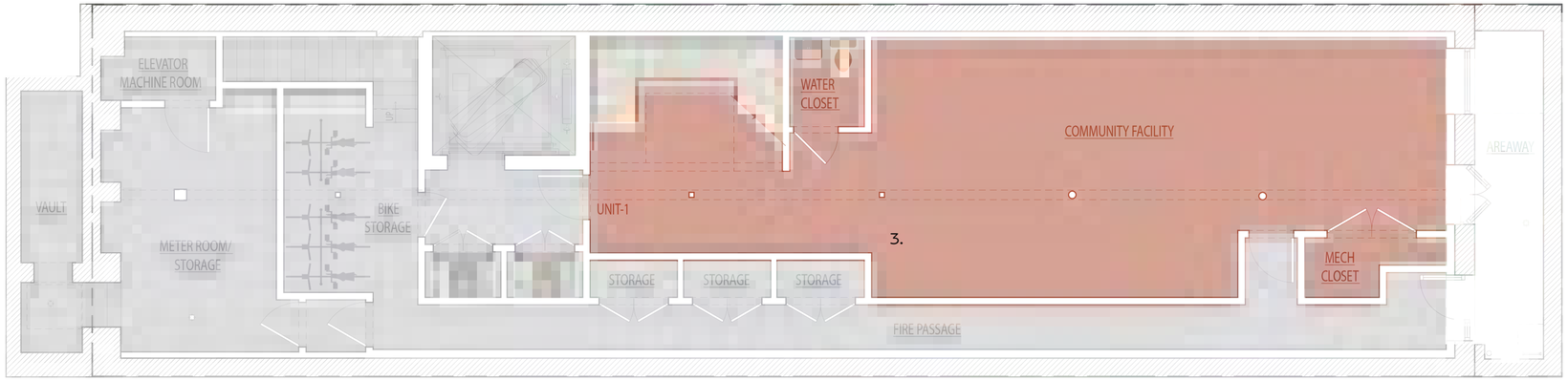


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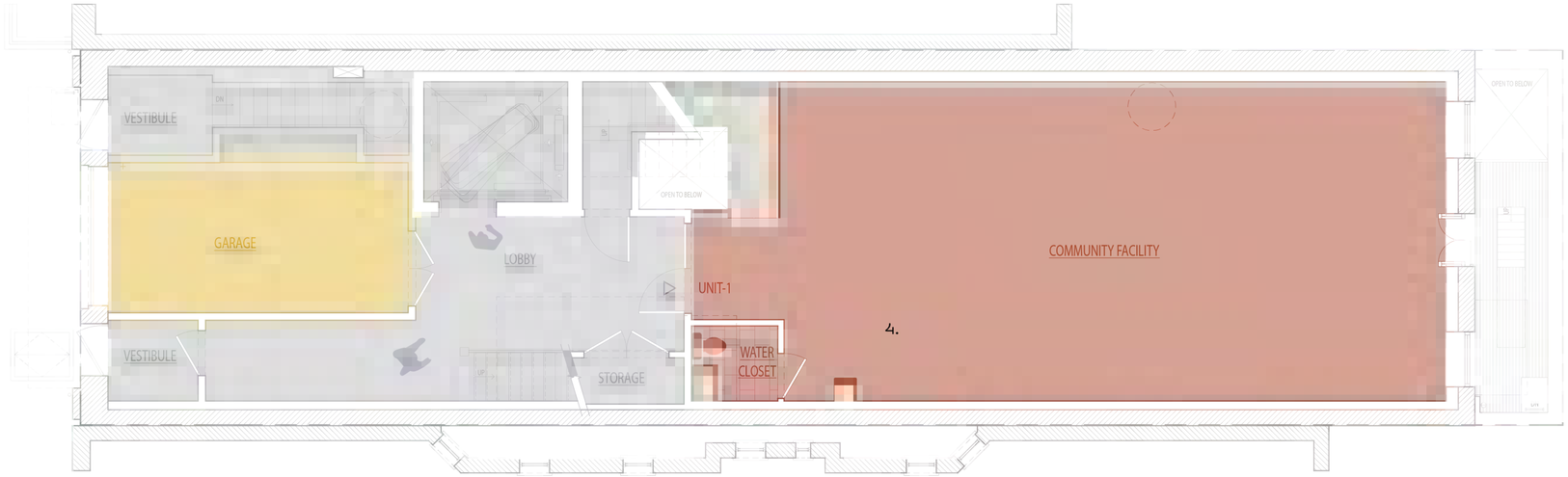
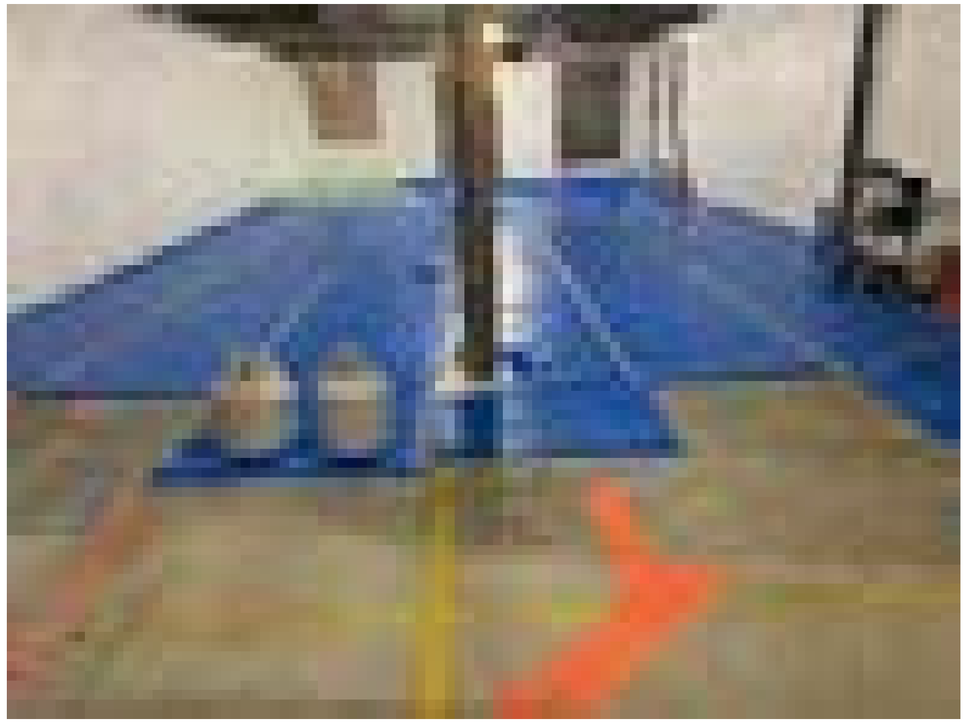



1. CELLAR PLAN
2. FIRST FLOOR PLAN
3. CELLAR COMMUNITY CENTER AREA = 1113 SF
4. FIRST FLOOR COMMUNITY CENTER AREA = 1400 SF

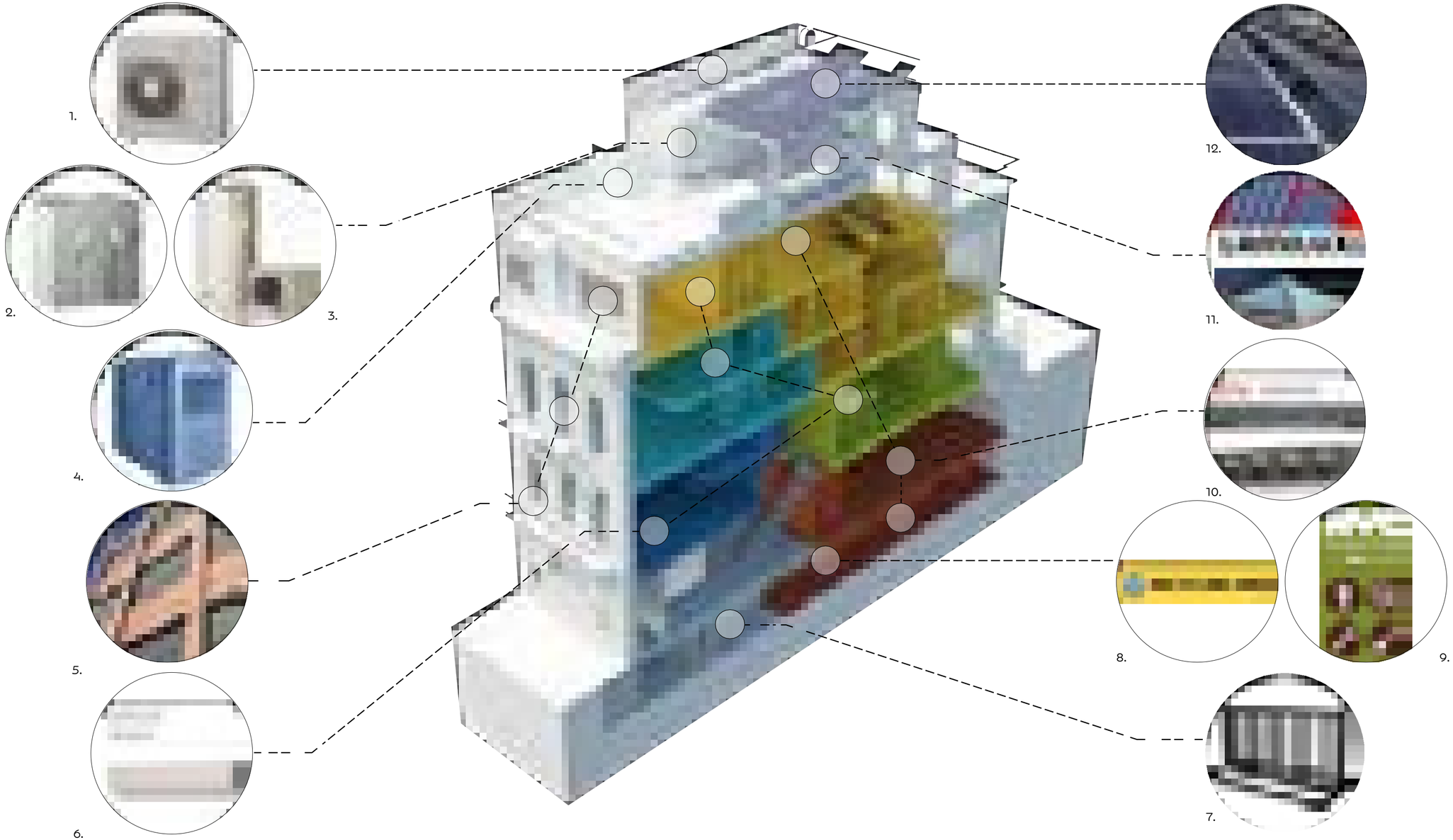
# PROGRESS PHOTOS: CELLAR





# ALL-ELECTRIC MECHANICAL UNITS + AMENITIES

BAXT INGUI Architects PC




1. CONDENSER UNITS: FUJITSU HEAT PUMPS (*SEE MECH. PLANS FOR SPECS*)
2. ERV: ZEHNDER COMFOAIR 550 ERV
3. WATER HEATER: SANDEN HEAT PUMP
4. ERV: VENTACITY
5. MOTORIZED ROLLER SHADES
6. AIR HANDLERS: WALL-MOUNTED FUJITSU (*SEE MECH. PLANS FOR SPECS*)
7. COMMON BIKE STORAGE
8. COMMON RECYCLING
9. COMMON COMPOSTING
10. AIR HANDLERS: CEILING-MOUNTED FUJITSU (*SEE MECH. PLANS FOR SPECS*)
11. PYRAMID SKYLIGHT: LAMILUX
12. PHOTOVOLTAIC SOLAR ARRAY

ALL-ELECTRIC MECHANICALS, ALLOWING ENGINE 16 TO BE FREE OF FOSSIL FUEL USAGE.

# SITE UPDATE: WINDOW DELIVERY

BAXT INGUI Architects PC

1.

3.

2.

4.

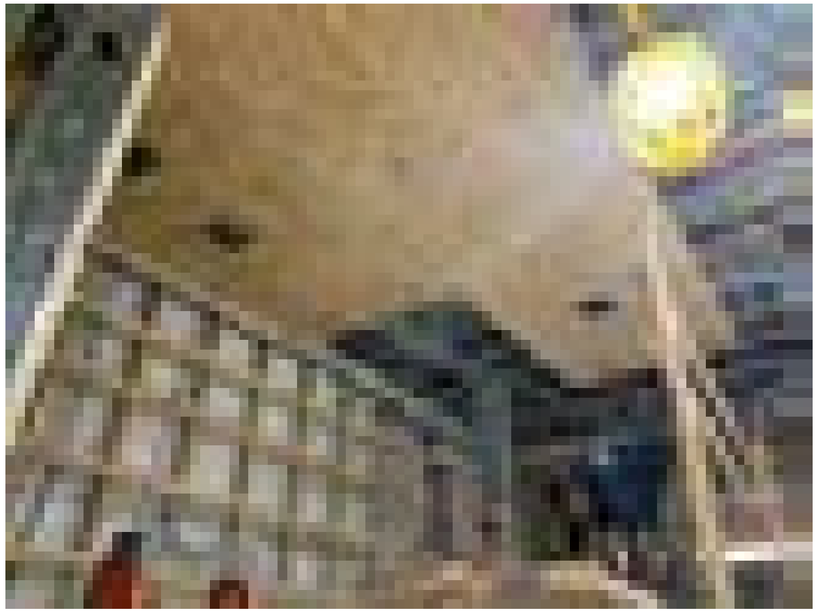
1. WINDOWS DELIVERED IN A SHIPPING CONTAINER
2. UNLOADING THE WINDOWS, CARTING THEM THROUGH THE GARAGE DOORS
3. UNLOADED WINDOWS
4. USING A DOLLY TO TRANSPORT WINDOWS

# SITE UPDATE: MECHANICAL CHASE WALL AND INTELLO BARRIER

BAXT | INGUI Architects PC

1.

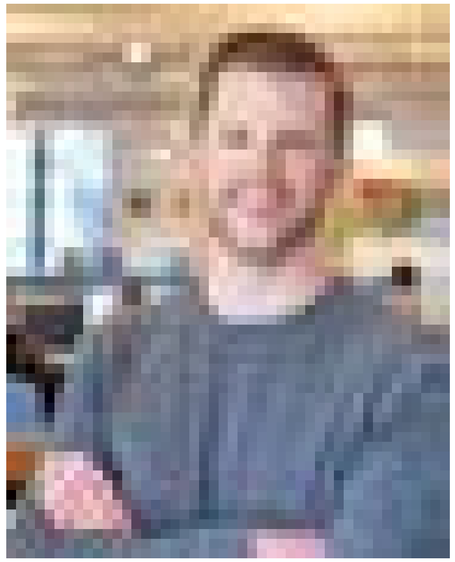
3.



2.

4.

ENGINE 16 | 223 E. 25TH



# THANK YOU!

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Architects PC