GREENING THE BRONX

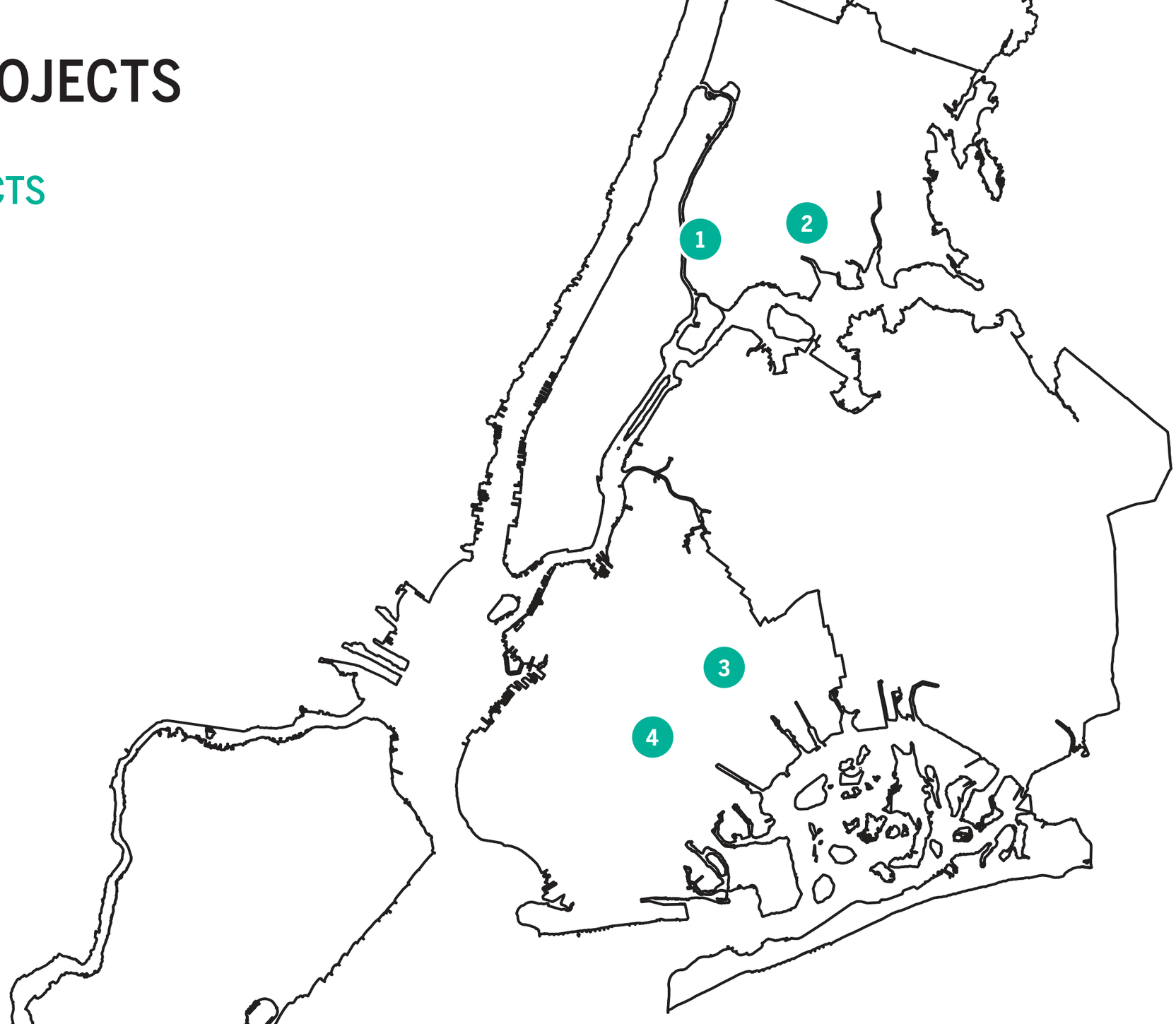
be ex
building energy exchange

DattnerArchitects

PASSIVE HOUSE PROJECTS

DATTNER ARCHITECTS PROJECTS

1. 425 Grand Concourse
2. 1675 Westchester Avenue
3. Chestnut Commons
4. Vital Brookdale



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
- Field-built metal panels
- 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

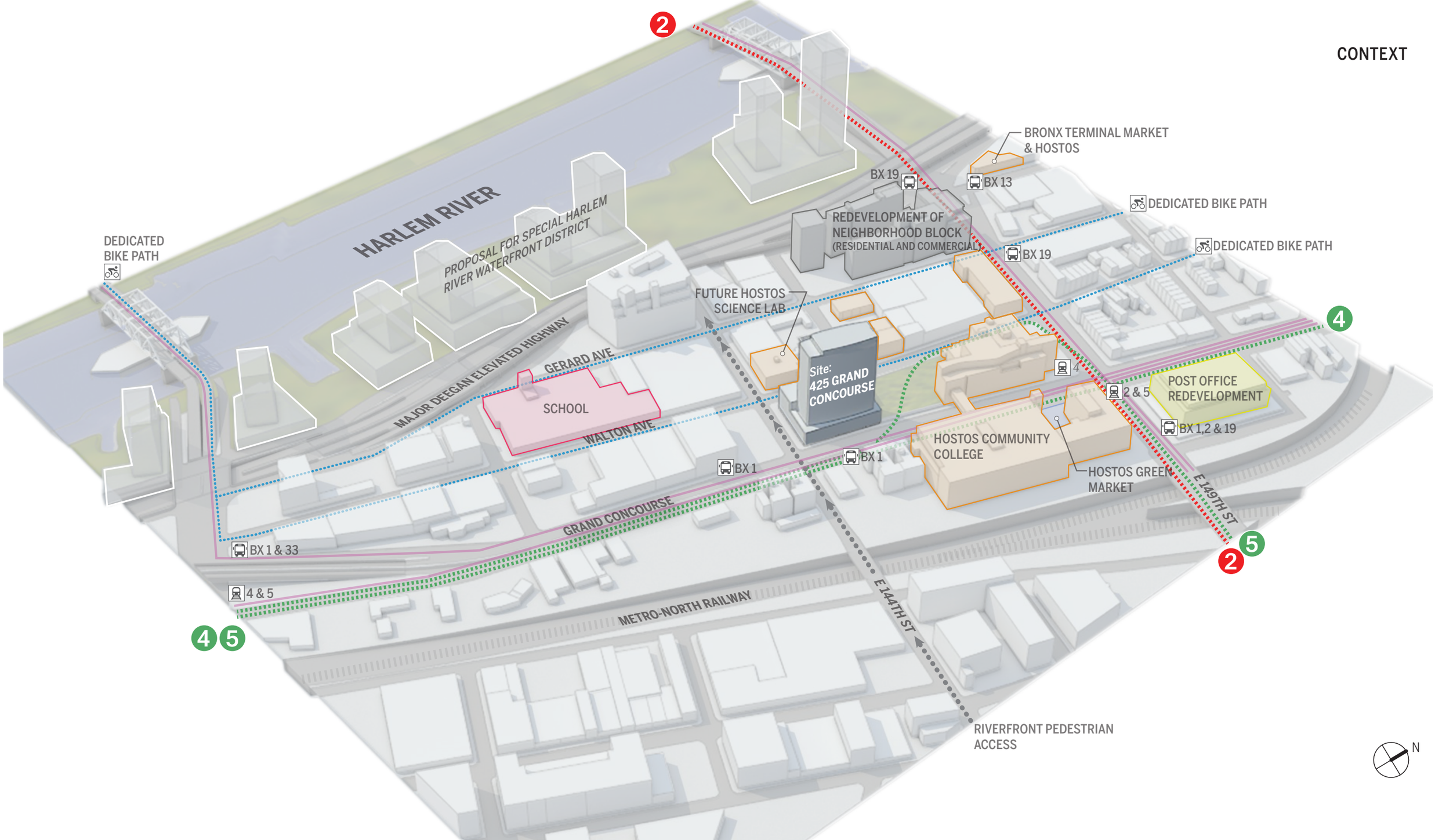
- Cast-in-Place Concrete
- PH System: PHIUS
- VRF: 2 Pipe
- ERV: Centralized
- Brick/EIFS on metal stud backup wall
- EUI: 21.14 kBTU/SF/YR

425 GRAND CONCOURSE

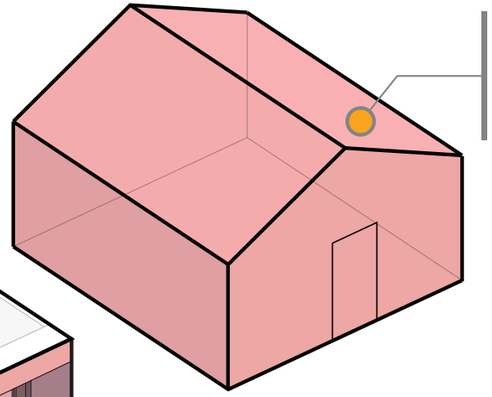
ENVELOPE EFFICIENCY REQUIREMENTS

ROOF	R-30
ABOVE GRADE WALLS	R-20
BELOW GRADE WALLS	R-10
WINDOWS - INSTALLED EFFECTIVE U-VALUE	0.25 Btu/hr*ft2*F
GLAZING SHGC	0.27
FACADE AIR TIGHTNESS REQUIREMENT	0.08 cfm/sf-facade @ 50 Pascals

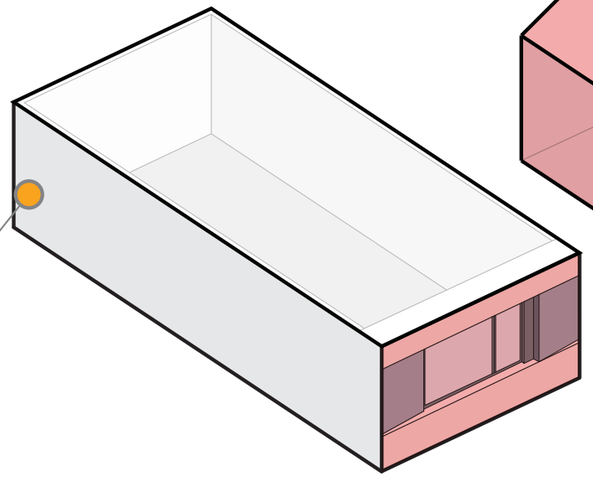
CONTEXT


HARLEM RIVER
PROPOSAL FOR SPECIAL HARLEM RIVER WATERFRONT DISTRICT
DEDICATED BIKE PATH
MAJOR DEEGAN ELEVATED HIGHWAY
GERARD AVE
SCHOOL
WALTON AVE
FUTURE HOSTOS SCIENCE LAB
Site: 425 GRAND CONCOURSE
REDEVELOPMENT OF NEIGHBORHOOD BLOCK (RESIDENTIAL AND COMMERCIAL)
BRONX TERMINAL MARKET & HOSTOS
BX 19
BX 13
DEDICATED BIKE PATH
DEDICATED BIKE PATH
BX 19
4
2 & 5
POST OFFICE REDEVELOPMENT
BX 1,2 & 19
HOSTOS COMMUNITY COLLEGE
HOSTOS GREEN MARKET
BX 1
BX 1
GRAND CONCOURSE
E 149TH ST
BX 1 & 33
4 & 5
METRO-NORTH RAILWAY
E 144TH ST
RIVERFRONT PEDESTRIAN ACCESS
N

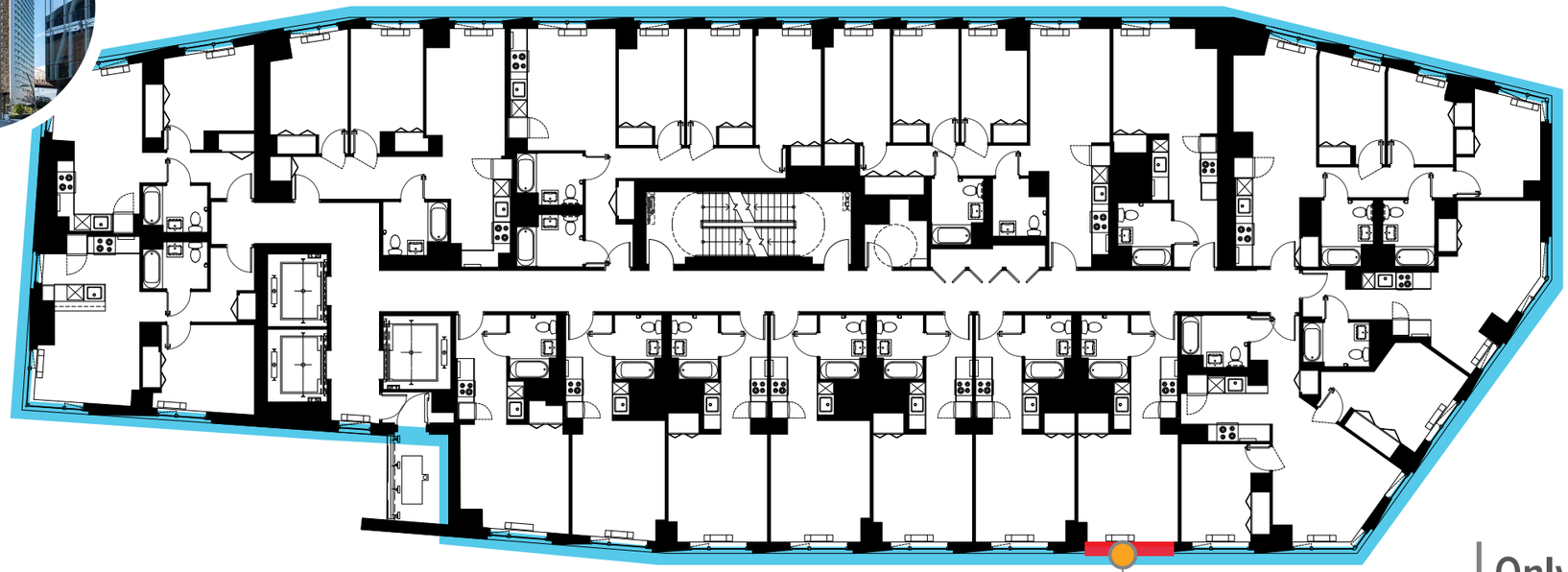
LOW SURFACE TO VOLUME RATIO



Freestanding house



Typical studio apartment at the house



Only one surface of this apartment is exposed

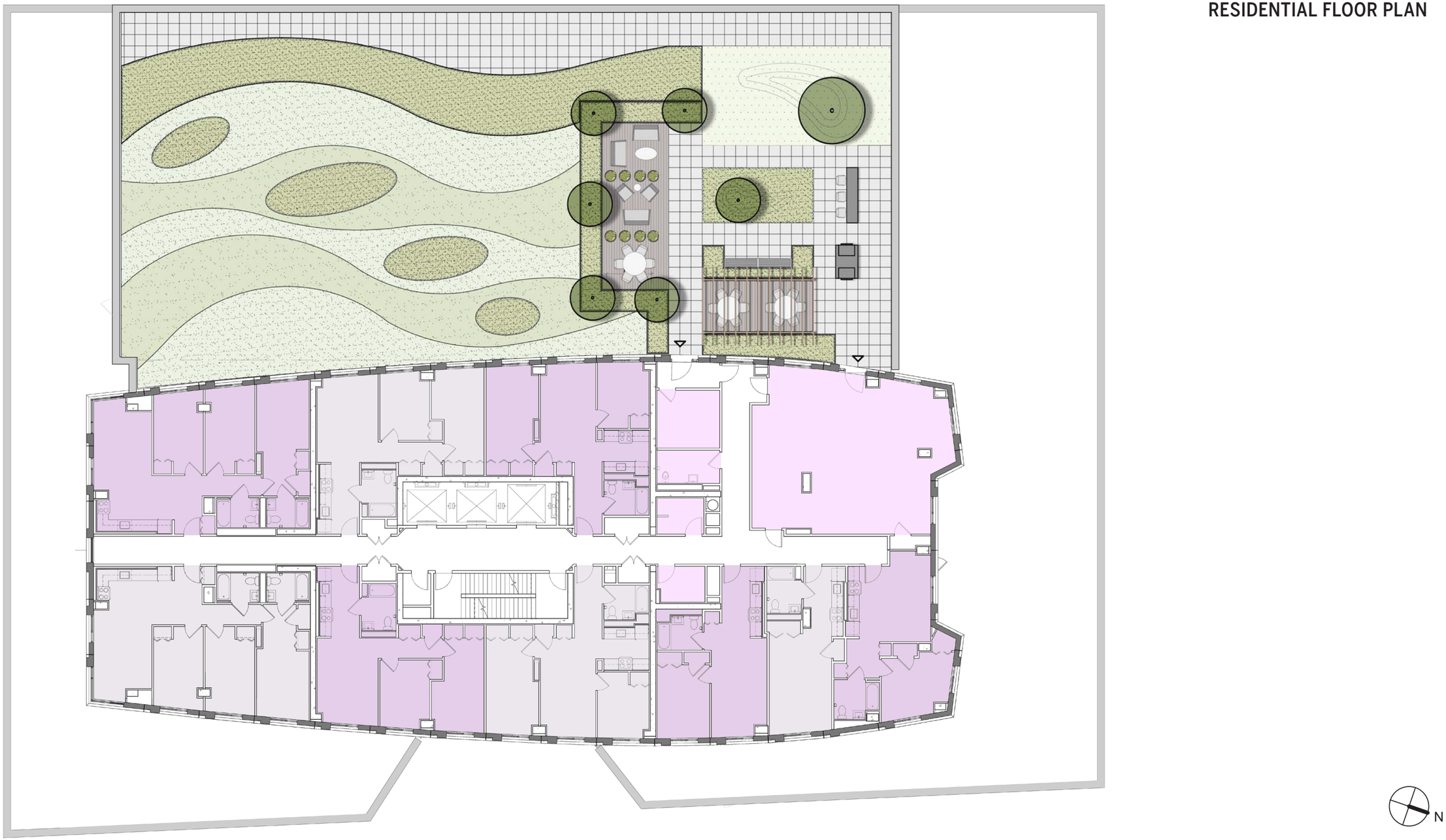
Courtesy of Handel Architects

USE DIAGRAM

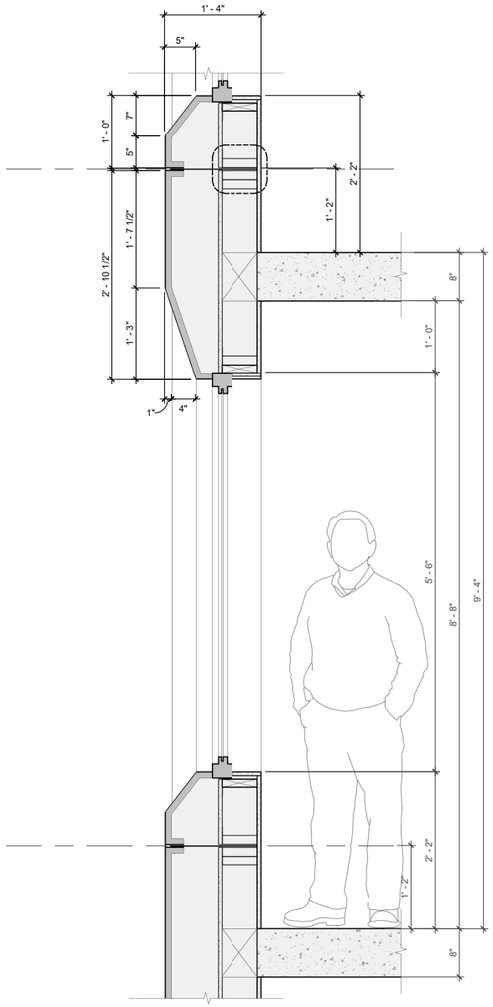
PASSIVE HOUSE ENCLOSURE
RESIDENTIAL
RESIDENTIAL TERRACE
EDUCATIONAL FACILITY
CULTURAL
MEDICAL
RESIDENTIAL LOBBY
RETAIL

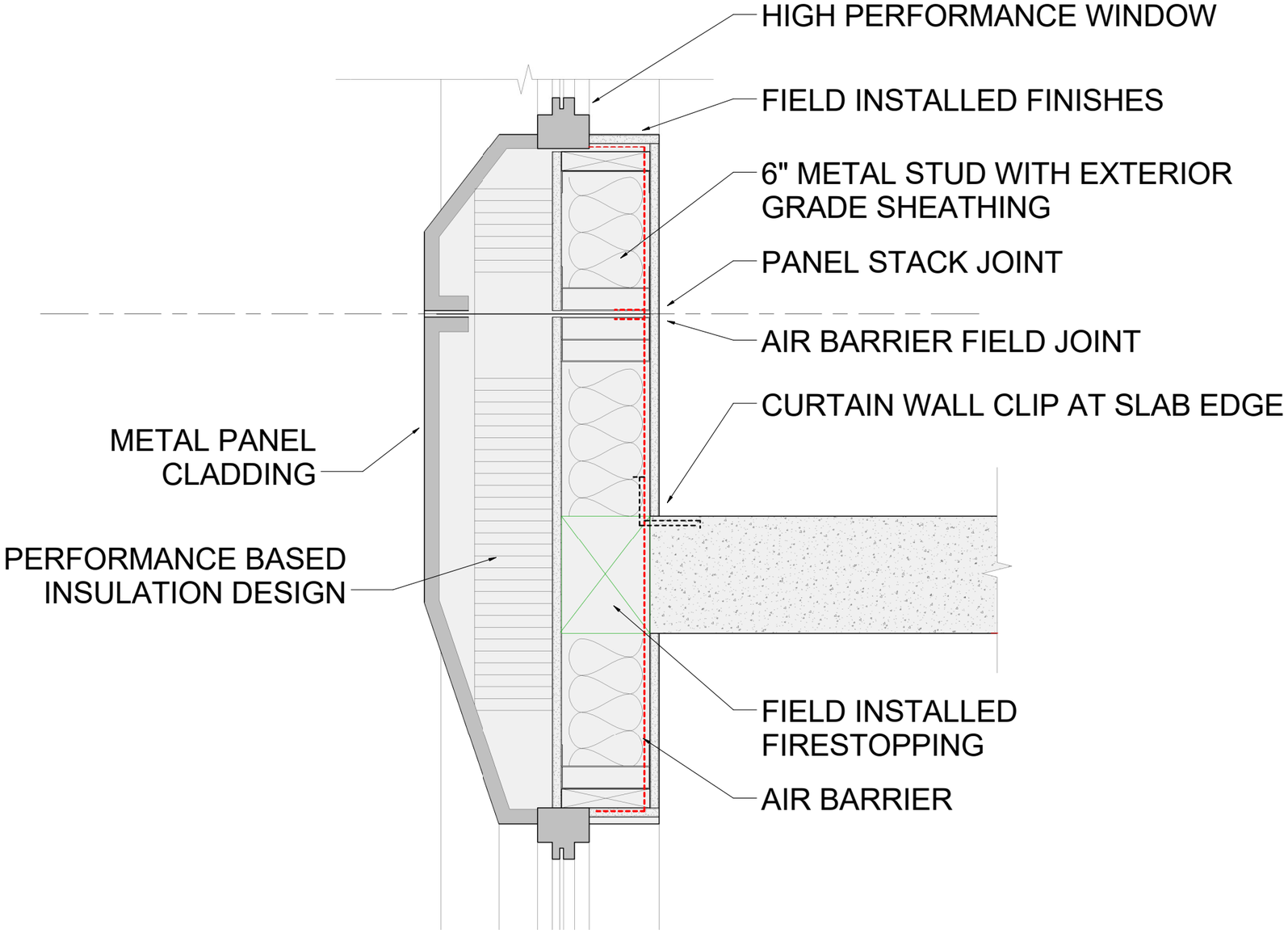
GROUND FLOOR PLAN

RESIDENTIAL FLOOR PLAN



PREFABRICATED WALL PANELS

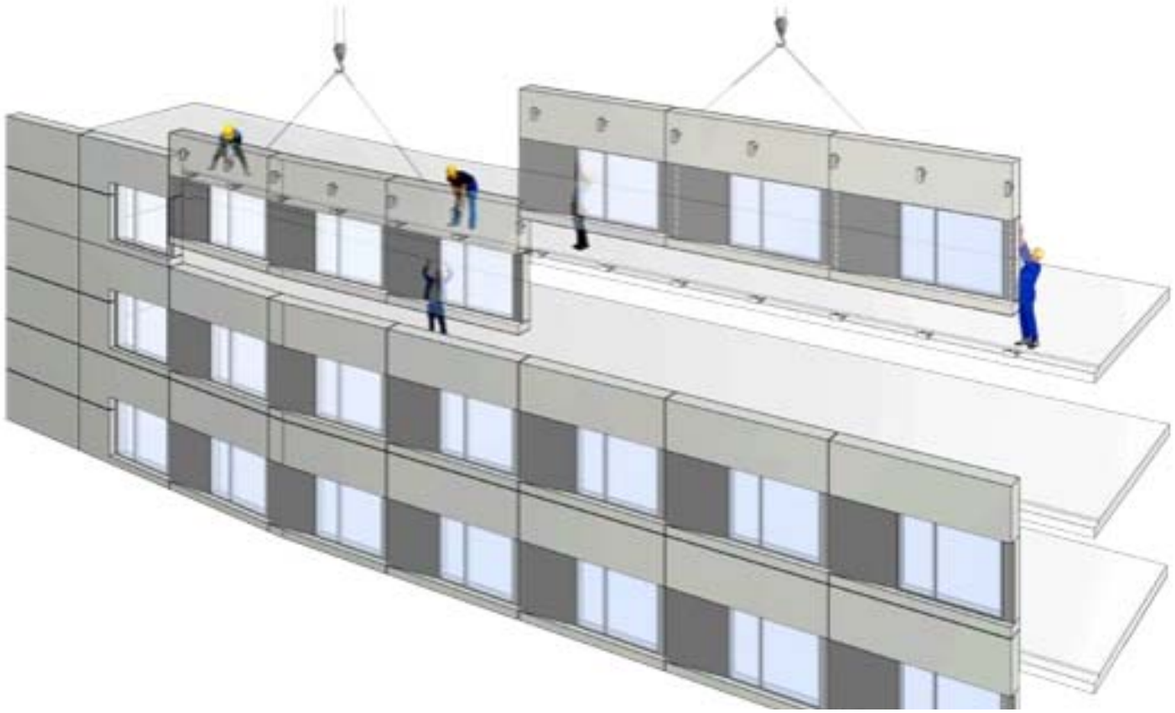


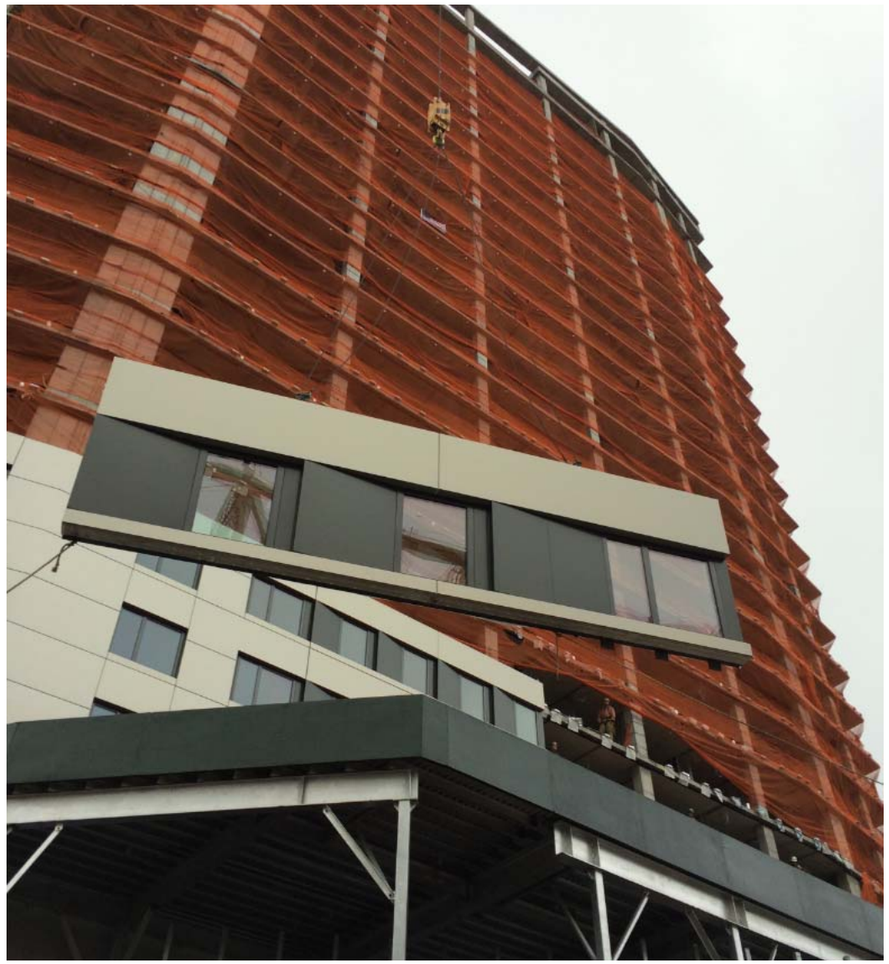


EVALUATING SCHEDULE, COST & CONSTRUCTABILITY

Pre-Fab Mega Panels

- Tower crane requirements
- Interior work coordination
- Mitigating risk





EVALUATING PROPOSED SYSTEMS

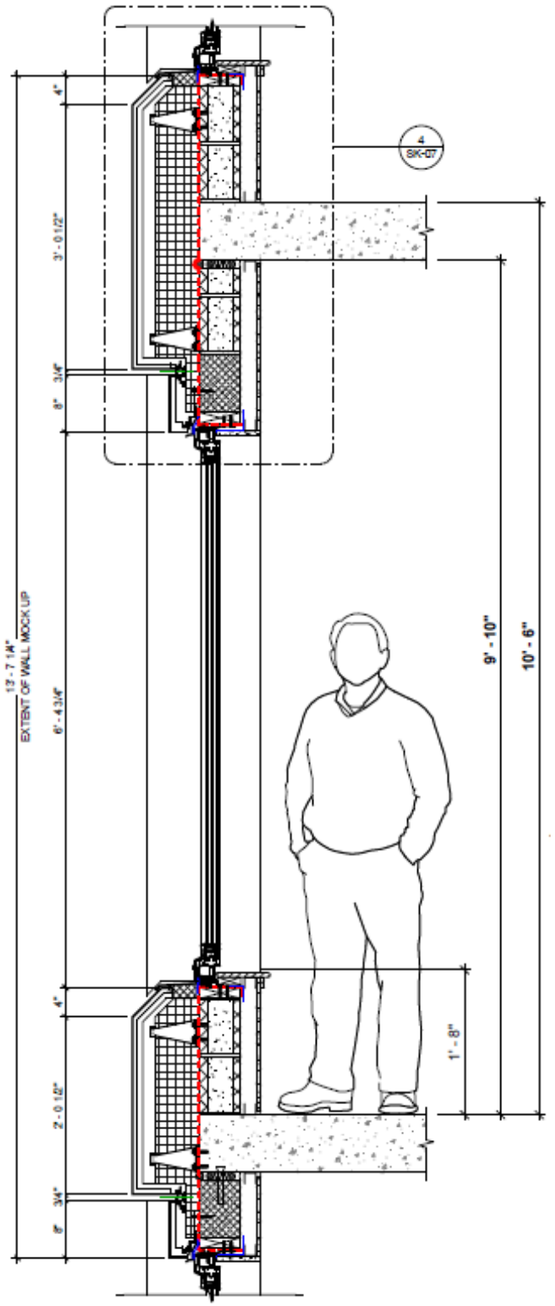
Field-Applied Panels

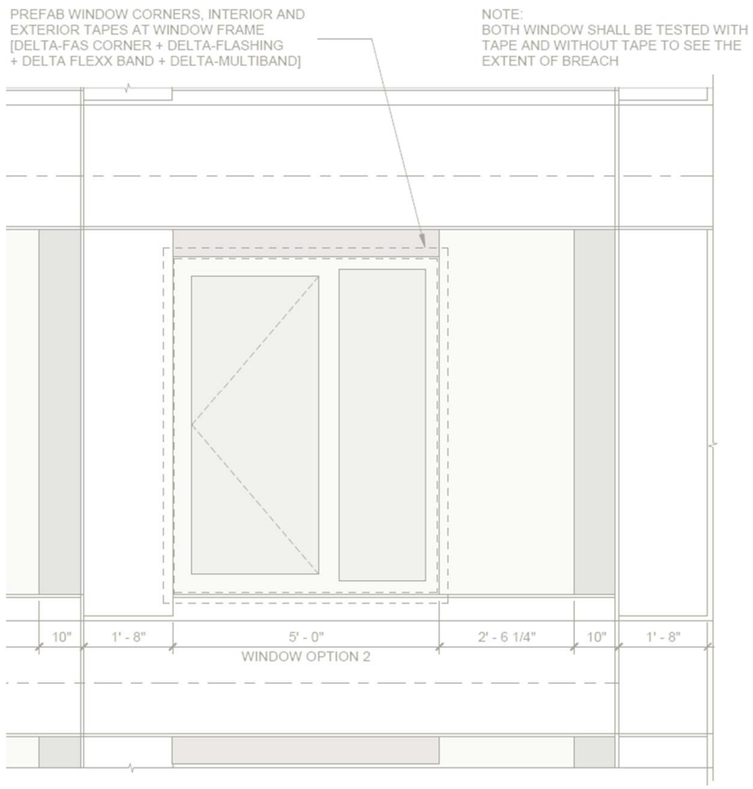
PROS

- Does not require crane to install
- Availability of suppliers/installers
- More cost effective
- Achieves continuous vapor barrier & insulation
- Allows interior build-out to start early
- Allows for more flexibility and tolerance for penetration coordination

CONS

- Warranty accountability issues
- Challenging QC procedures
- Weather dependent installation
- Extended installation duration




PREFAB WINDOW CORNERS, INTERIOR AND EXTERIOR TAPES AT WINDOW FRAME [DELTA-FAS CORNER + DELTA-FLASHING + DELTA FLEXX BAND + DELTA-MULTIBAND]
NOTE:
BOTH WINDOW SHALL BE TESTED WITH TAPE AND WITHOUT TAPE TO SEE THE EXTENT OF BREACH
10"
1' - 8"
5' - 0"
2' - 6 1/4"
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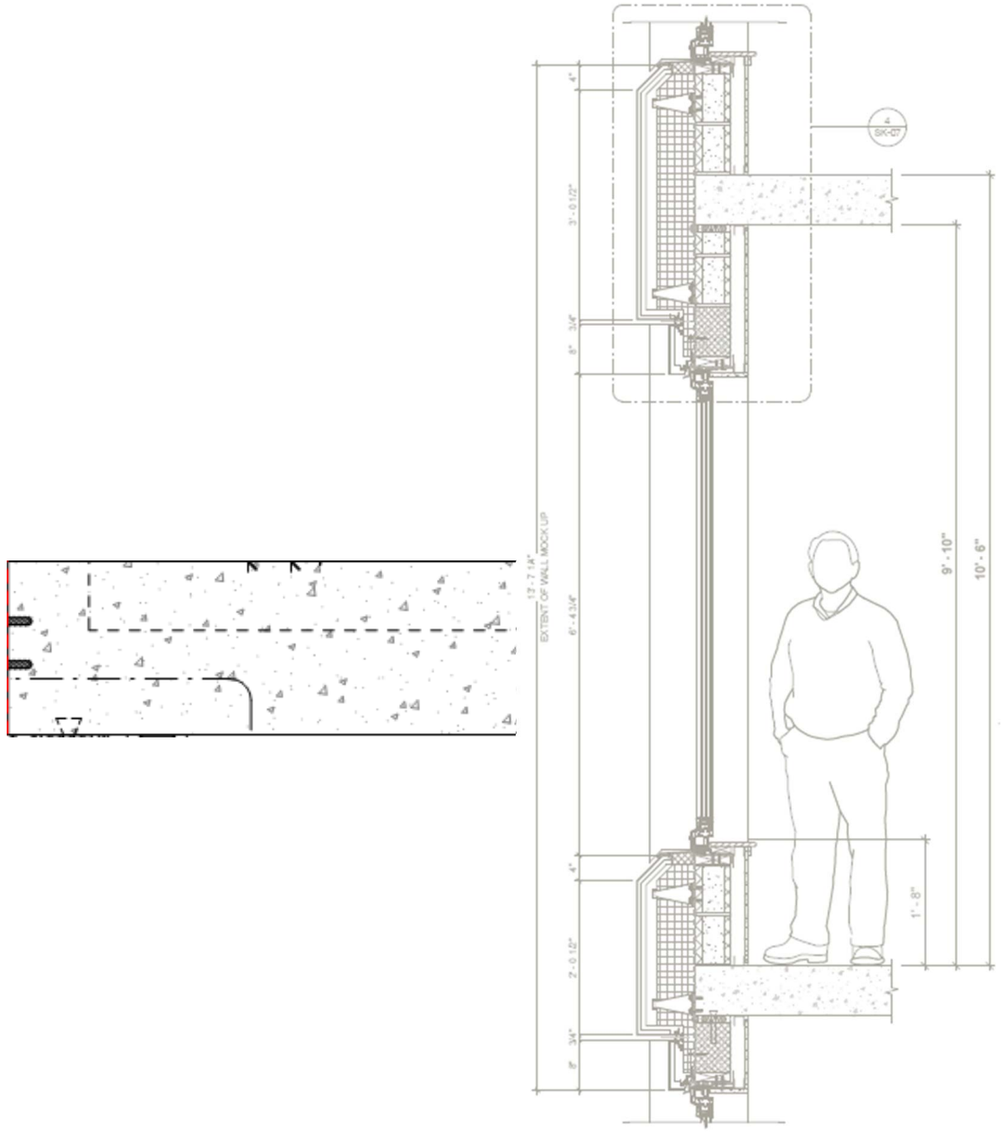
WINDOW OPTION 2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13' - 7 1/4"
EXTENT OF WALL MOCK UP
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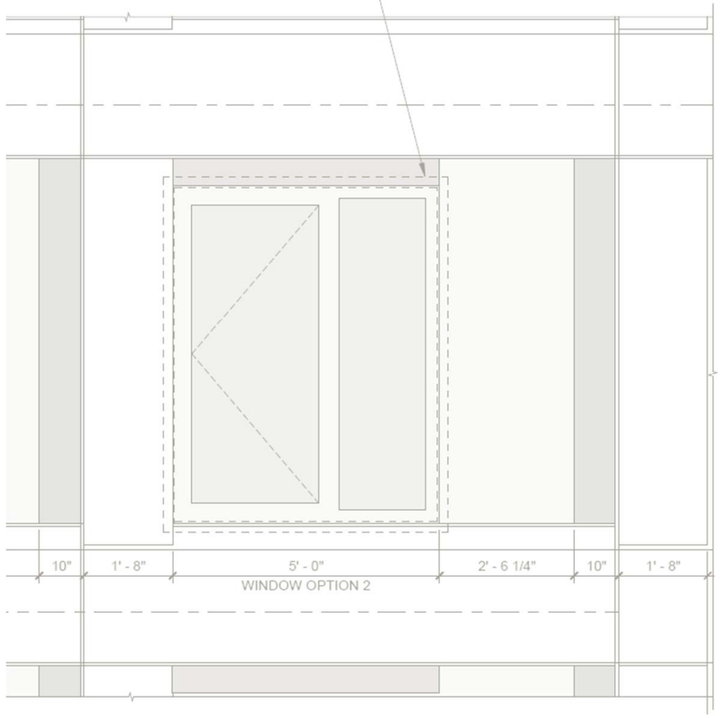

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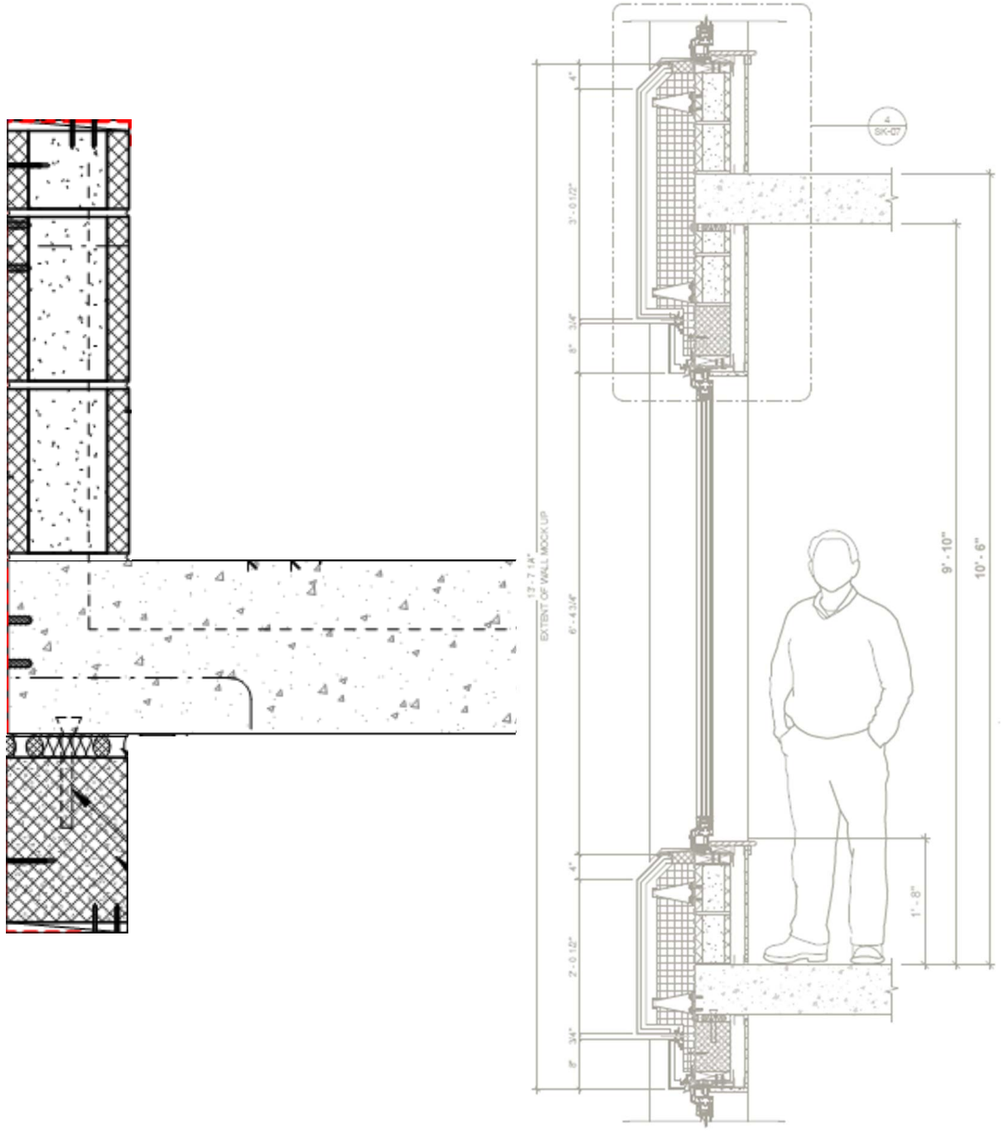

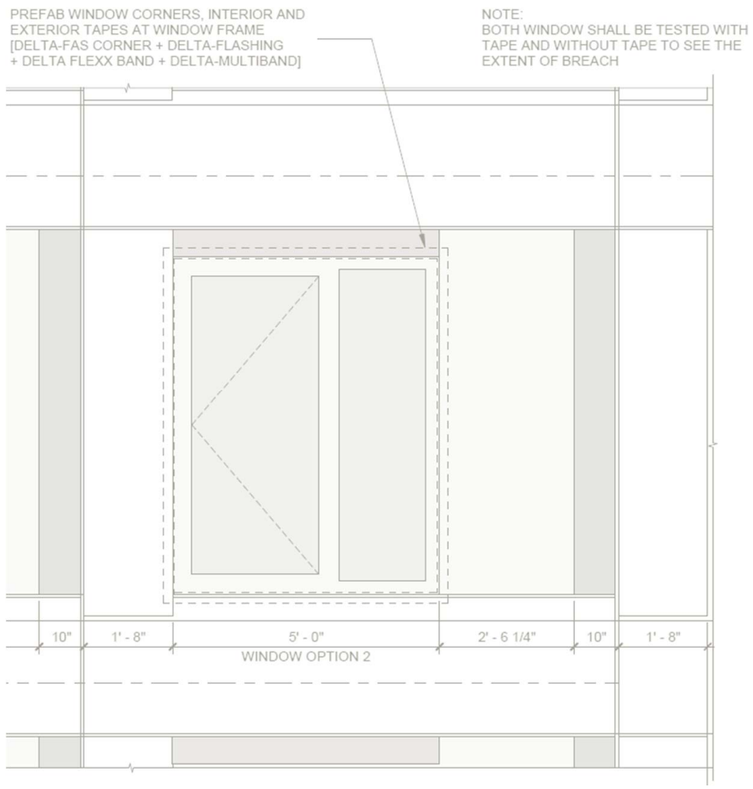
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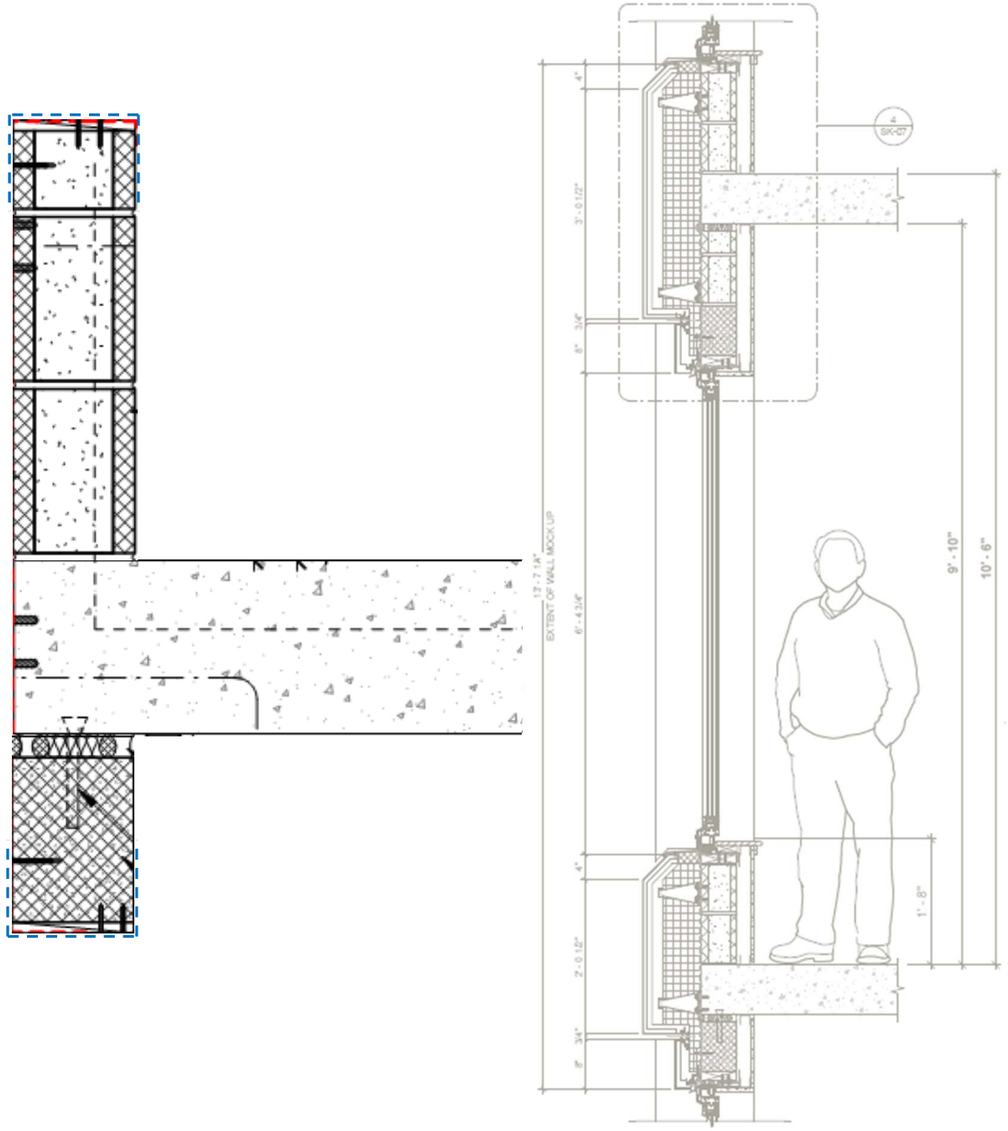
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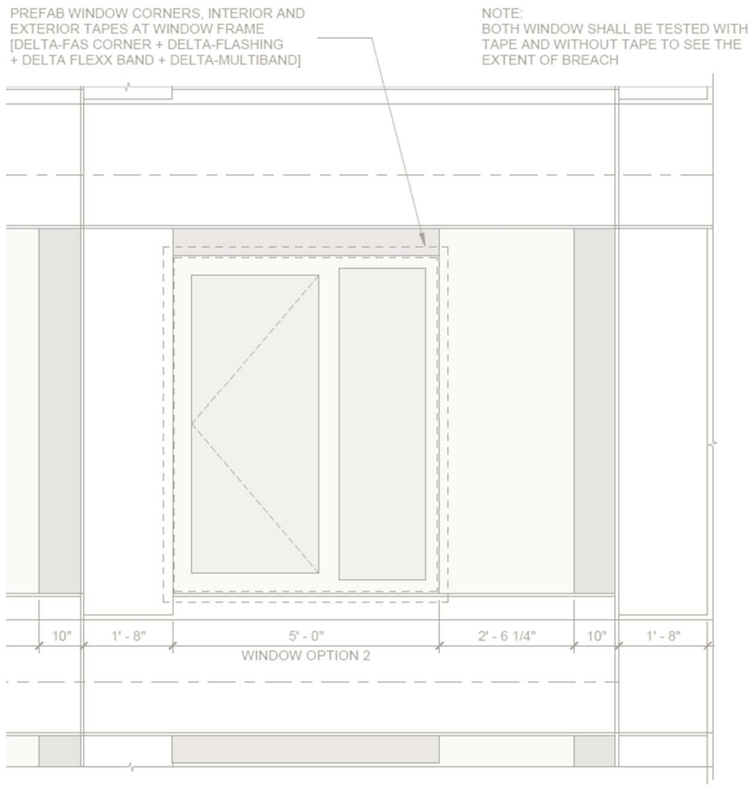
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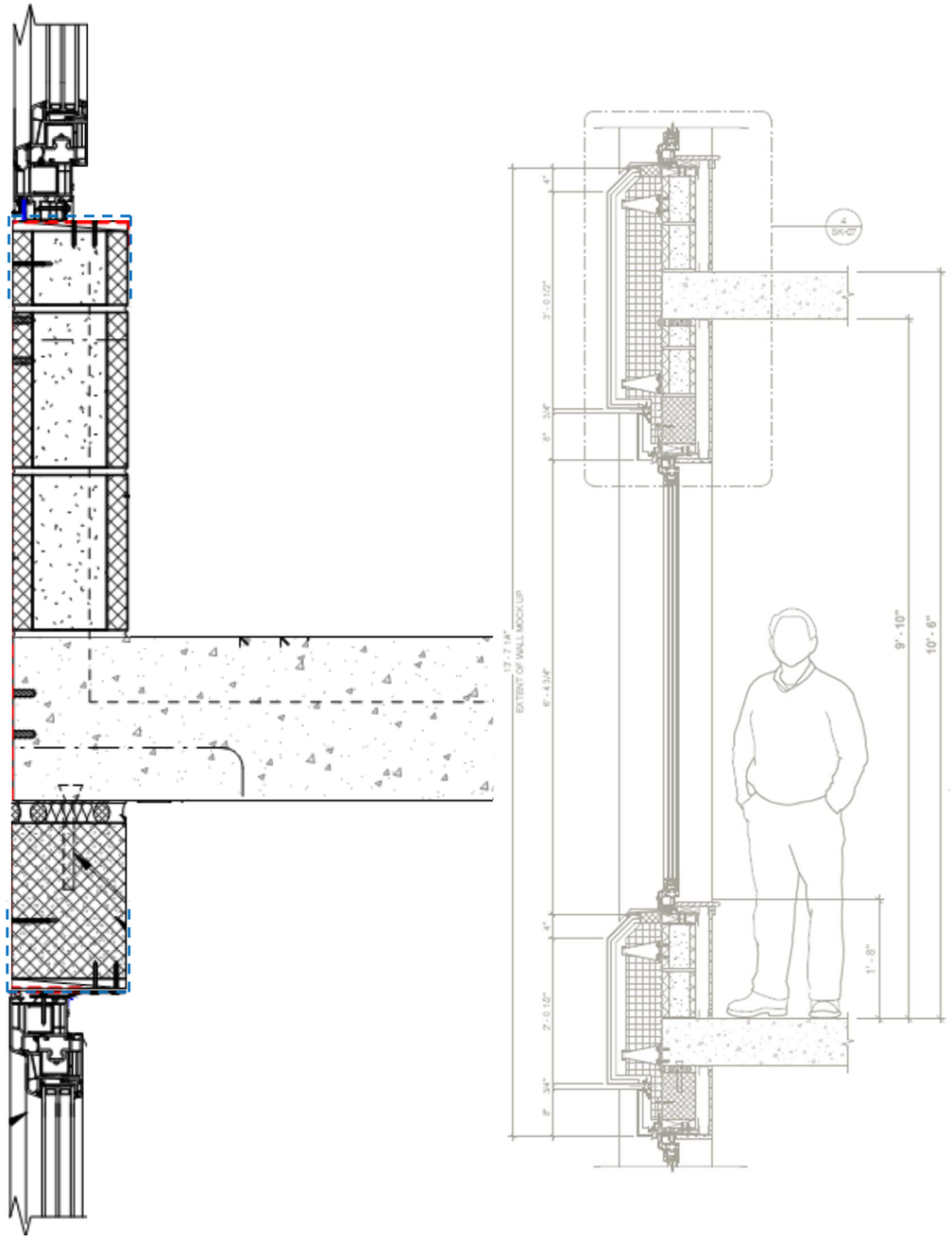
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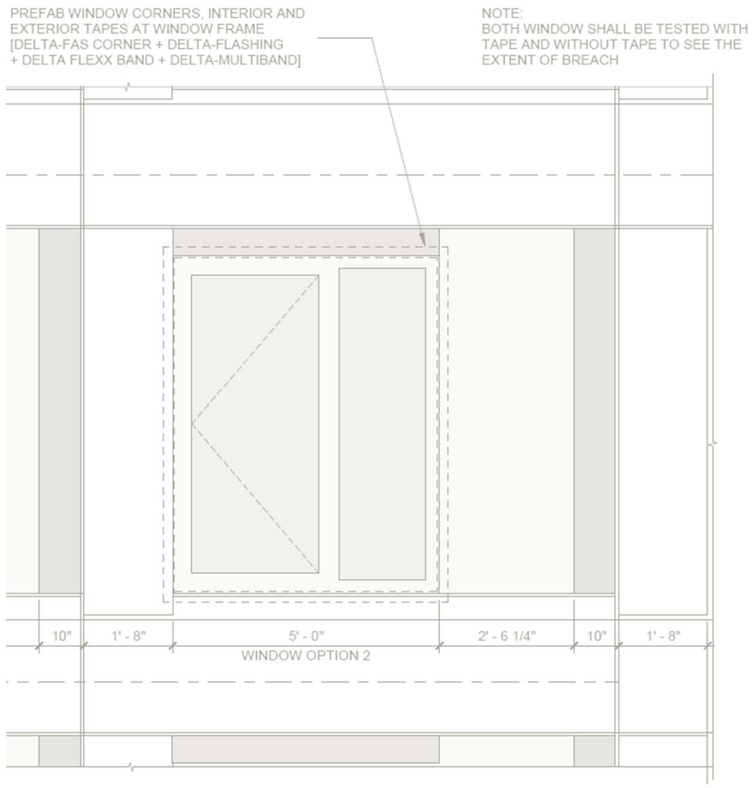
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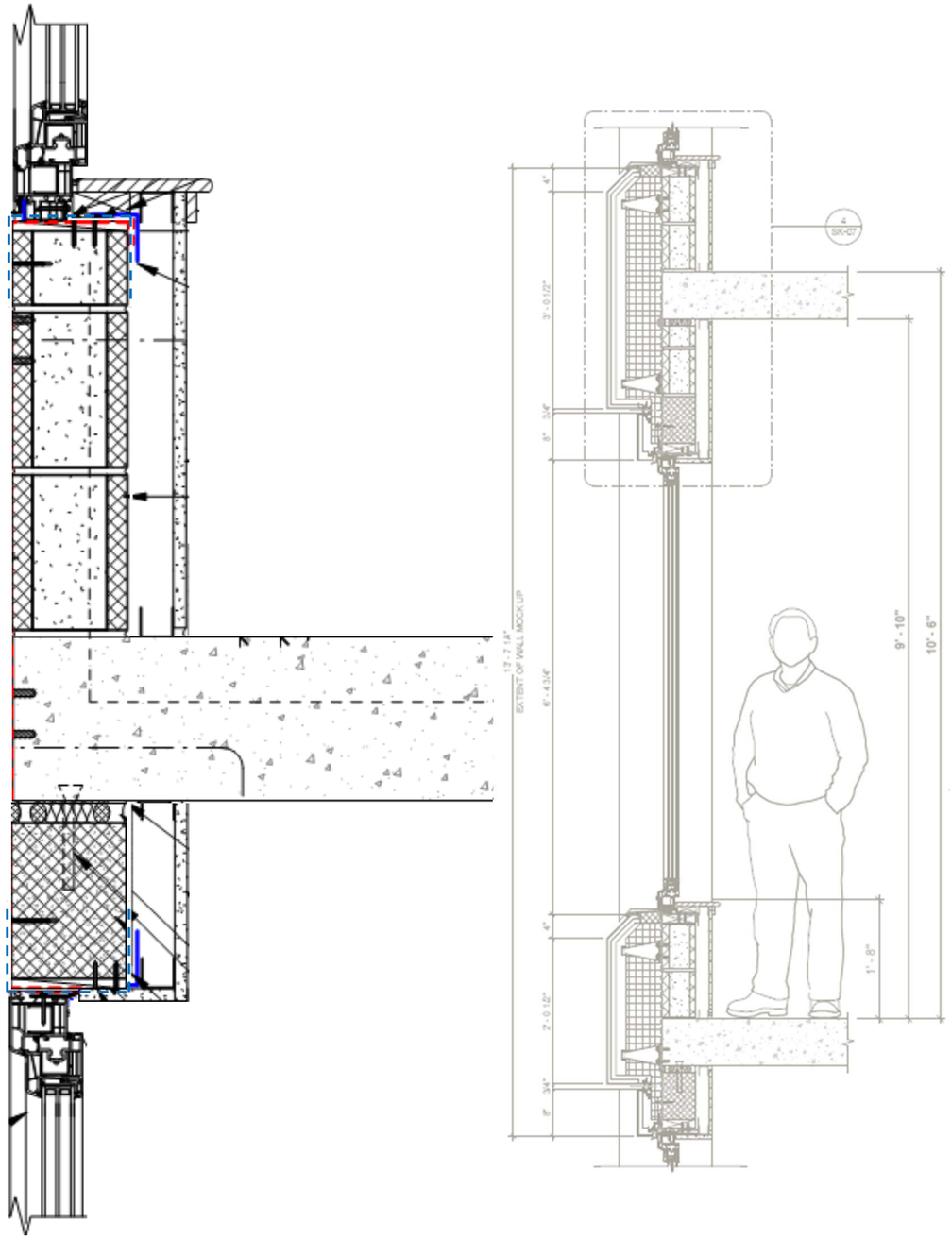
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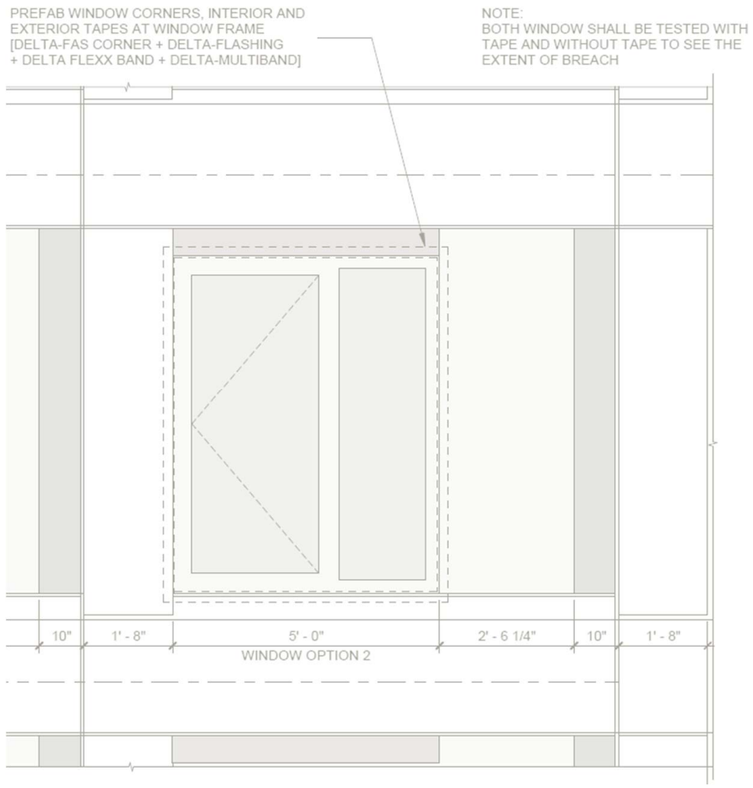
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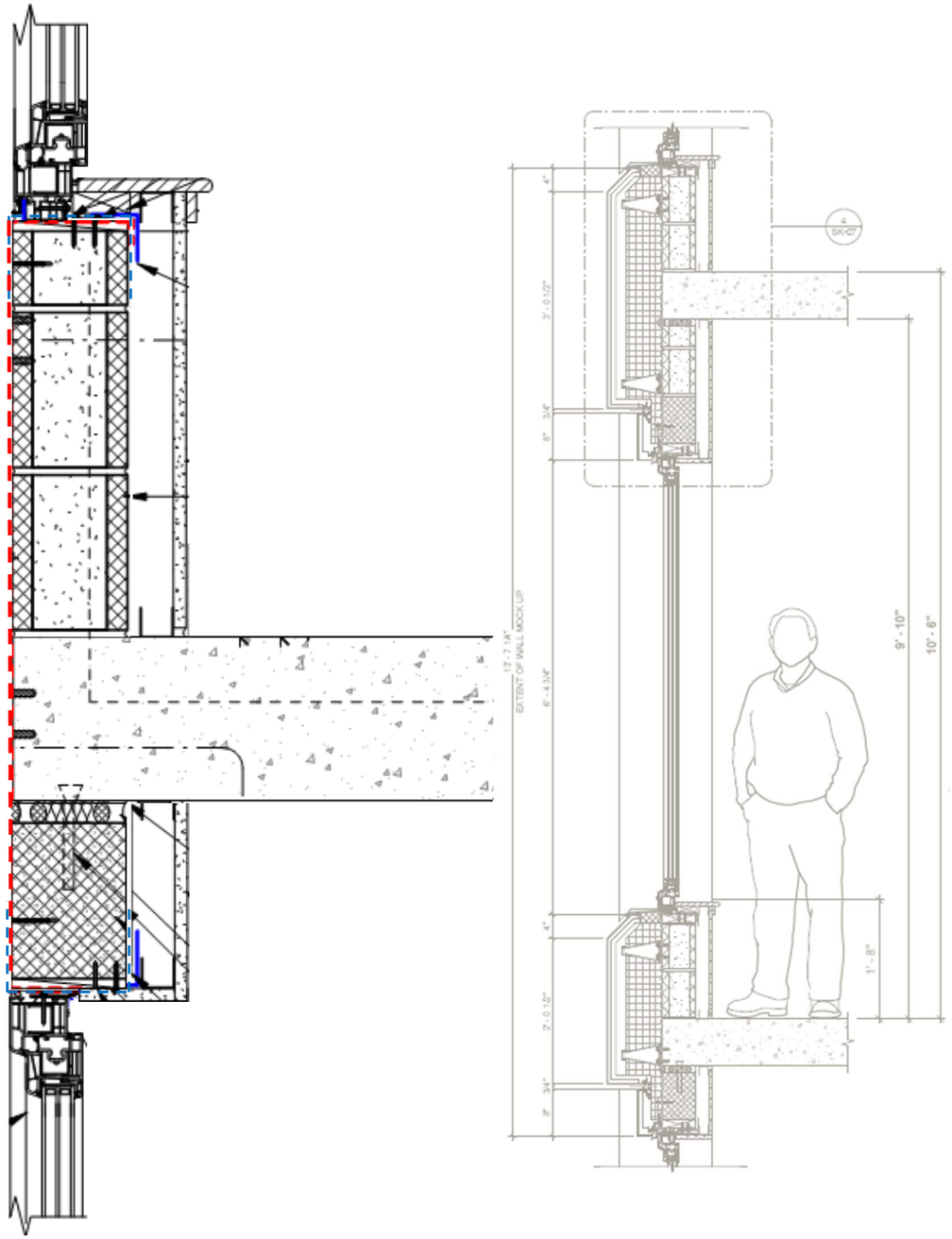
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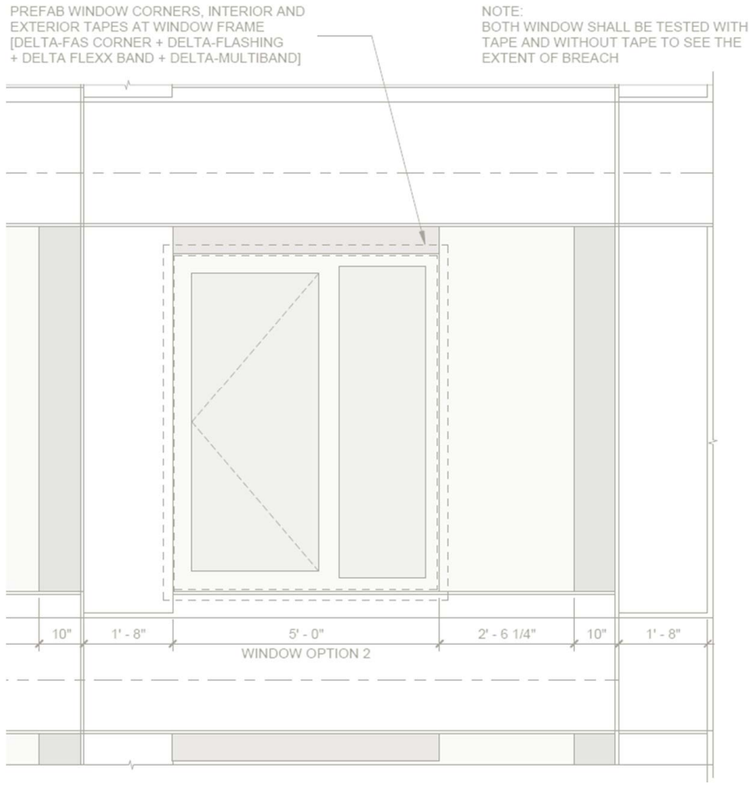
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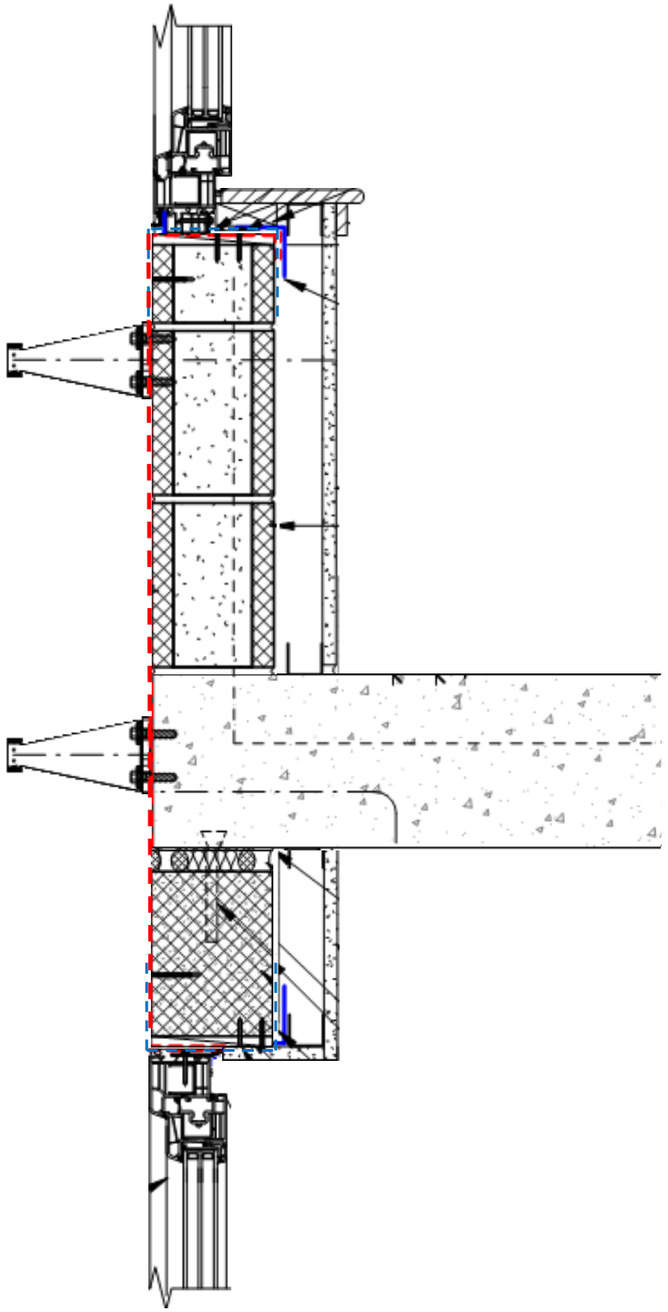

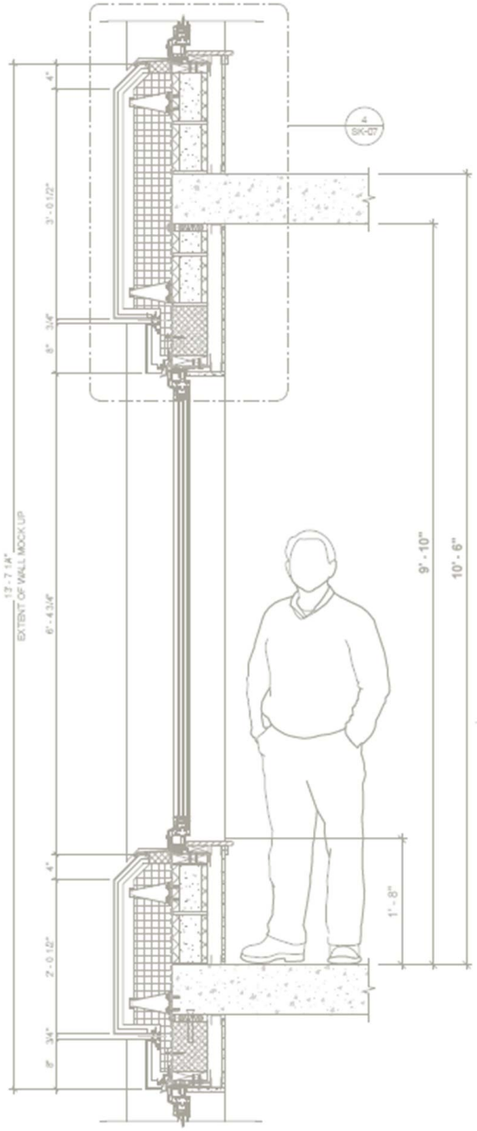
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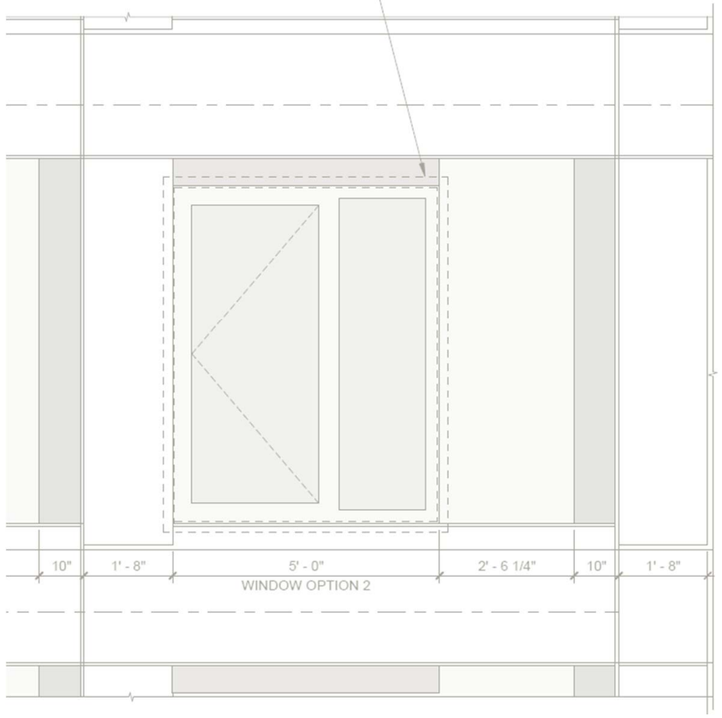

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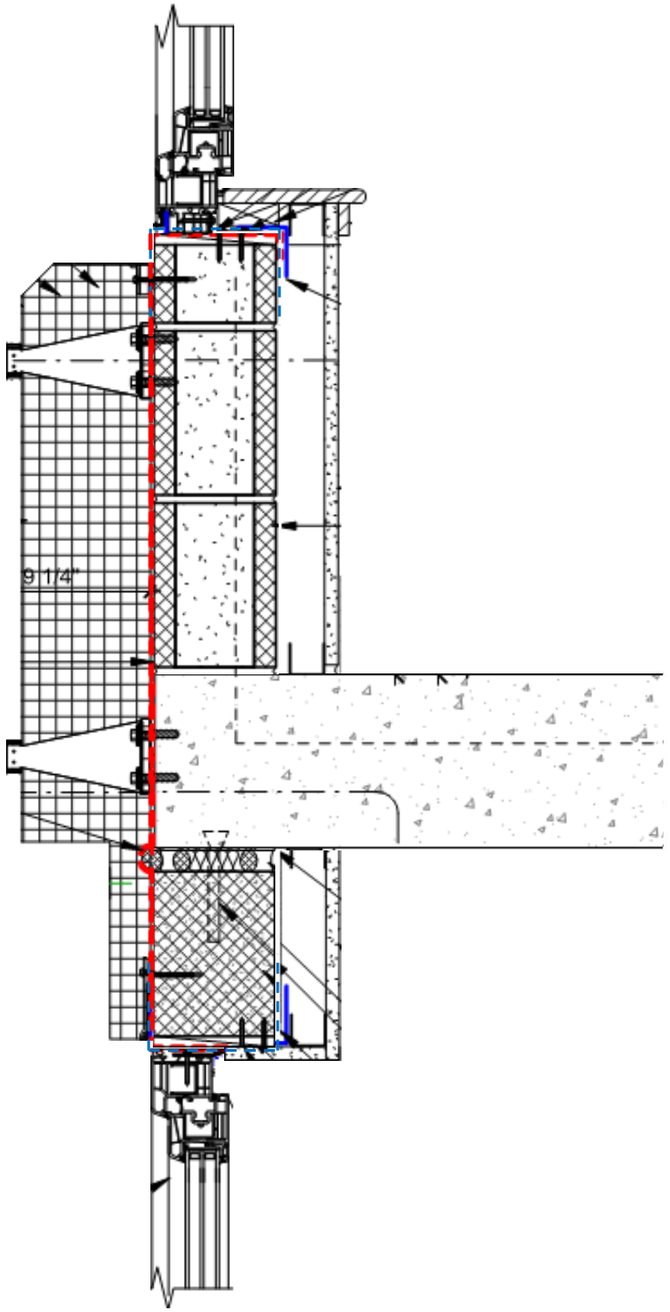

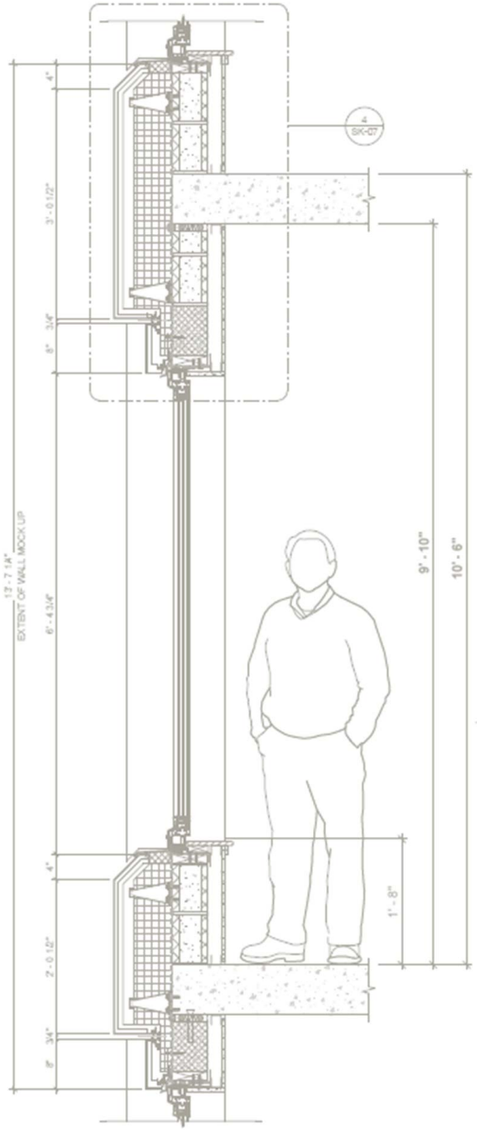

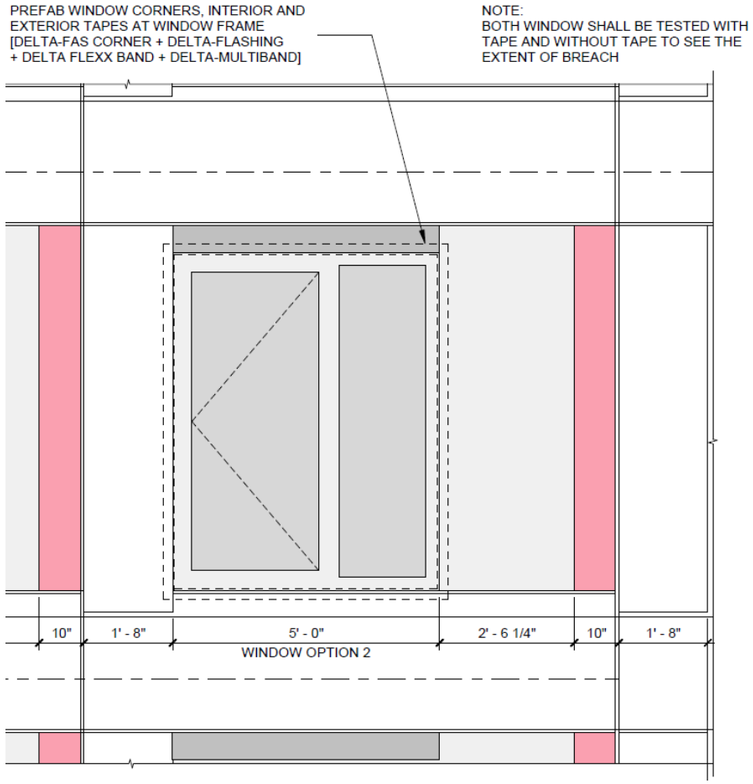
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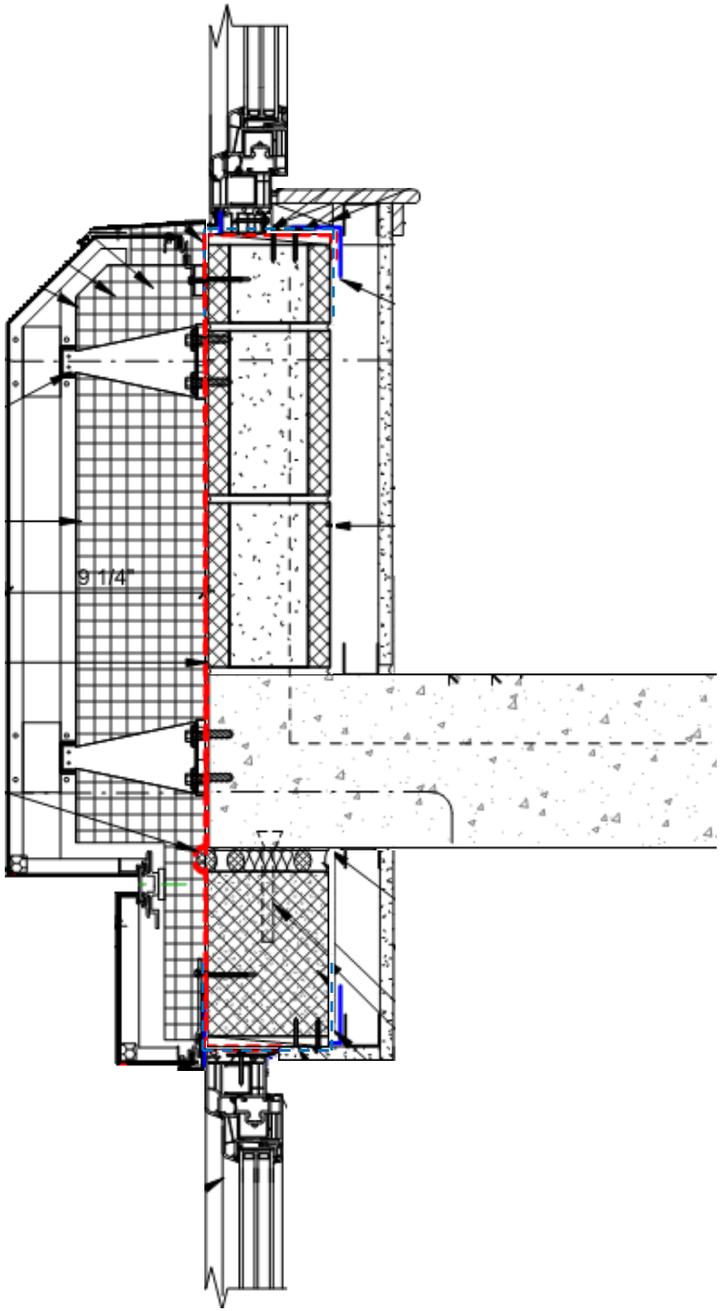
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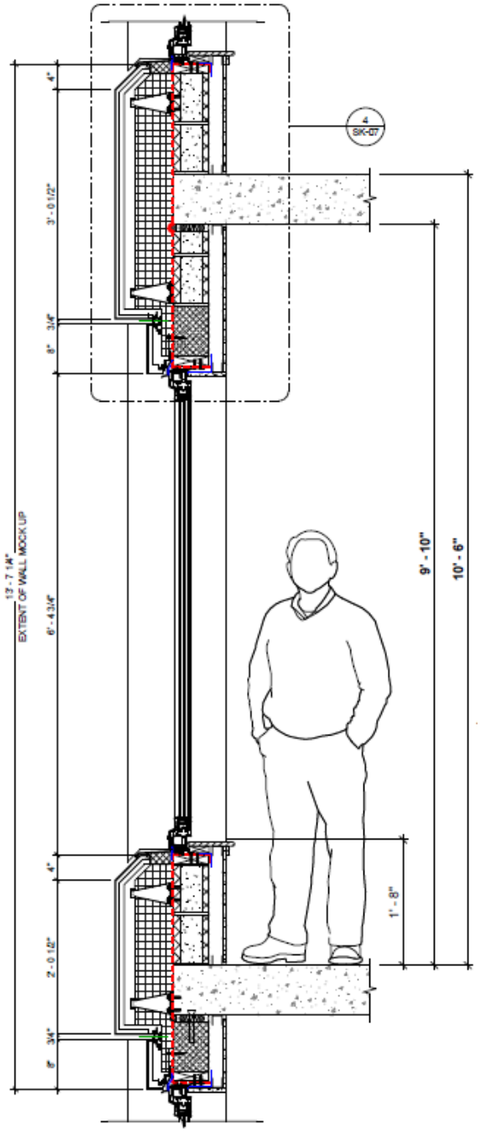
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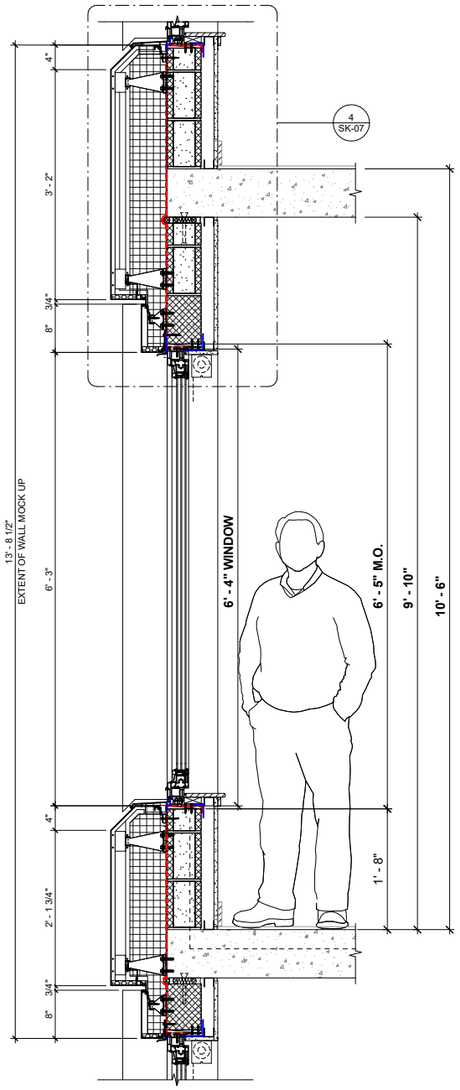
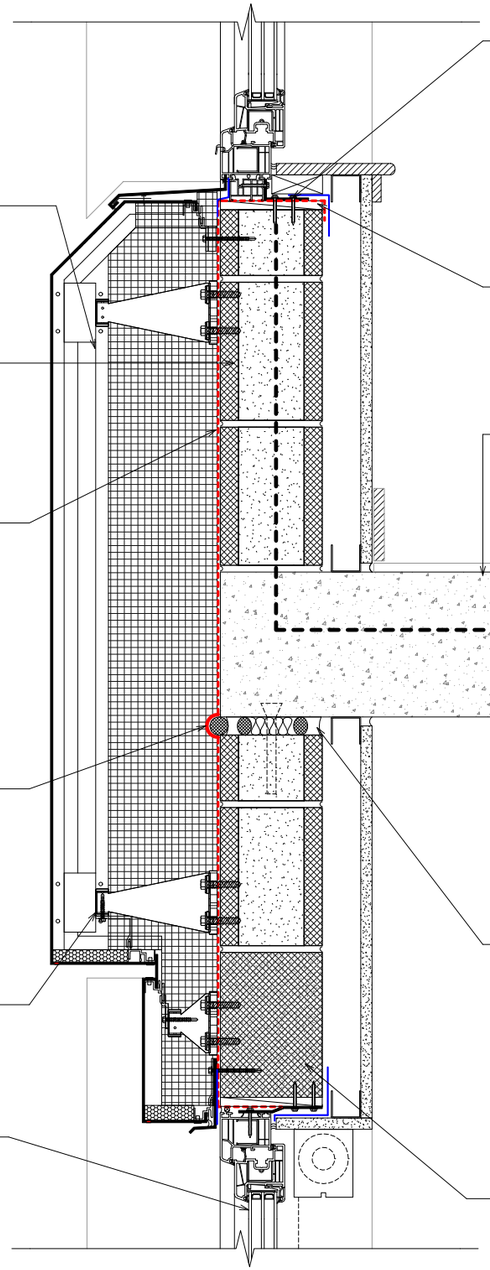
FIELD BUILT ASSEMBLY





WINDOW ANCHOR BRACKET

THERMALLY ISOLATING RAINSCREEN ATTACHMENT SYSTEM [KNIGHT WALL]

1/2" P.T. WOOD SHIM

6" CMU

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

8" CONCRETE FLOOR SLAB W/ REINFORCEMENT

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

1" MIN. MOVEMENT JOINT TO ACCOMMODATE FLOOR DEFLECTION WITH SILICONE FIRESTOP SEALANT AND MINERAL WOOL FIRESTOP INSULATION (L/400 = DEFLECTION MOVEMENT = 3/8" TO 1/2")

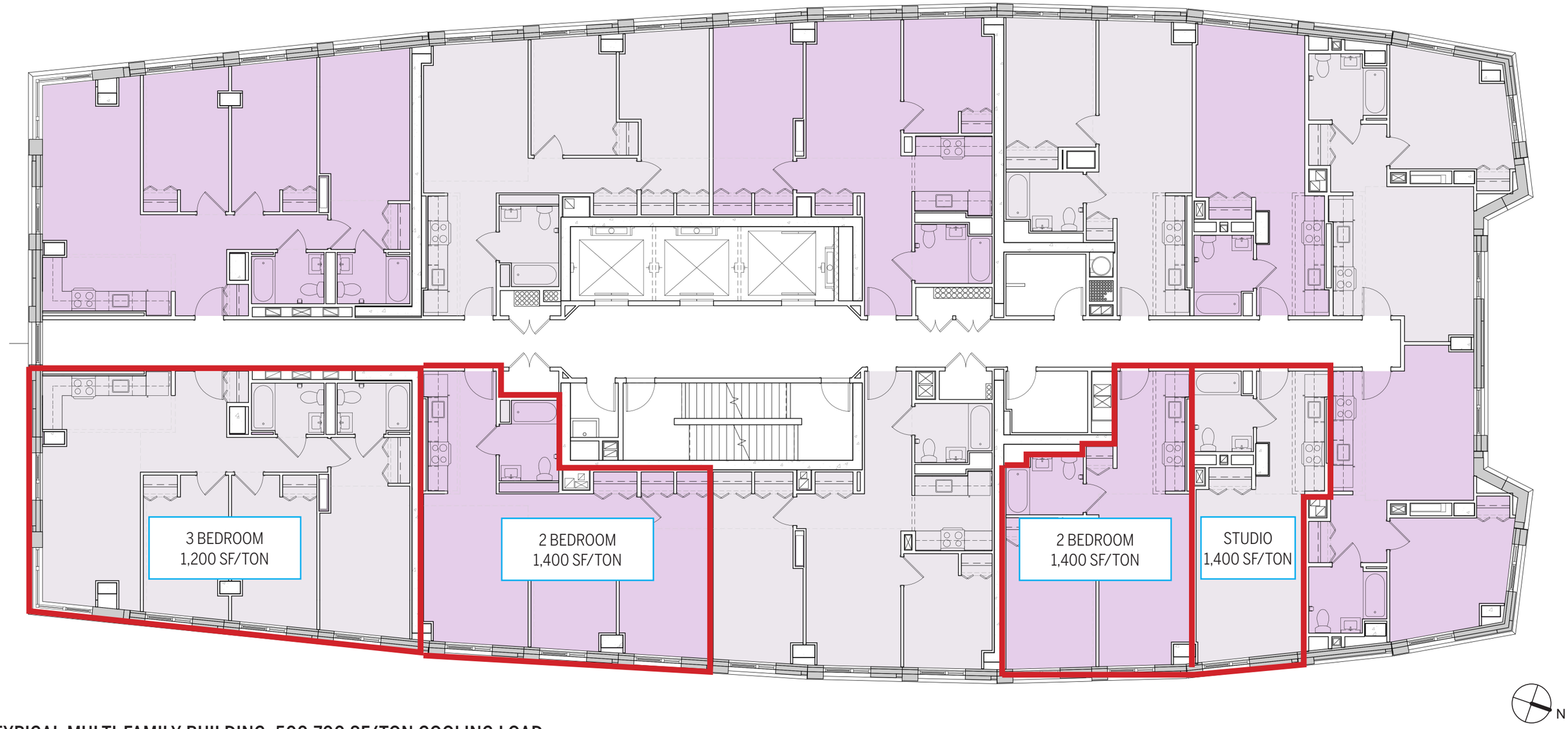
THERMALLY ISOLATING RAINSCREEN ATTACHMENT SYSTEM [KNIGHT WALL]

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

PRECAST LINTEL

HEATING & COOLING DESIGN

SYSTEM SIZING

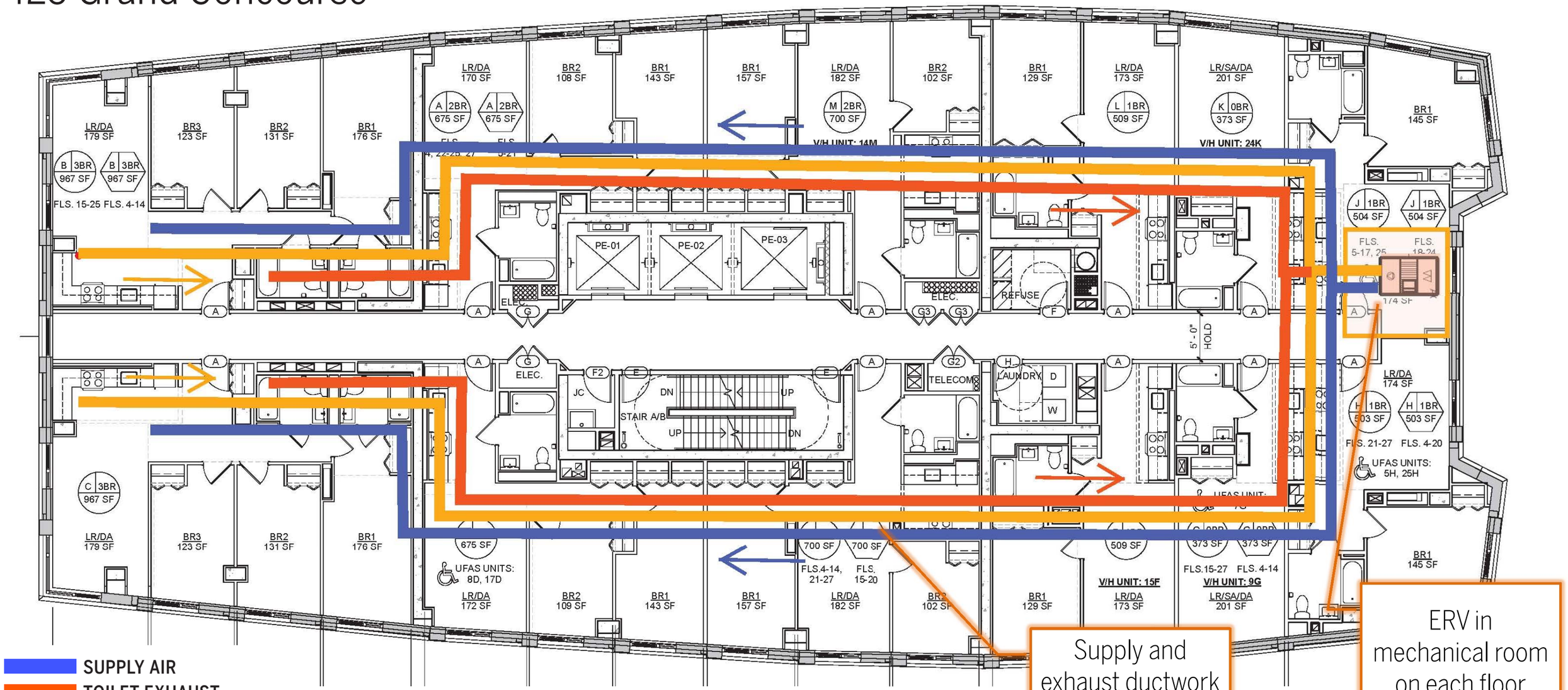


TYPICAL MULTI-FAMILY BUILDING: 500-700 SF/TON COOLING LOAD

VENTILATION DESIGN

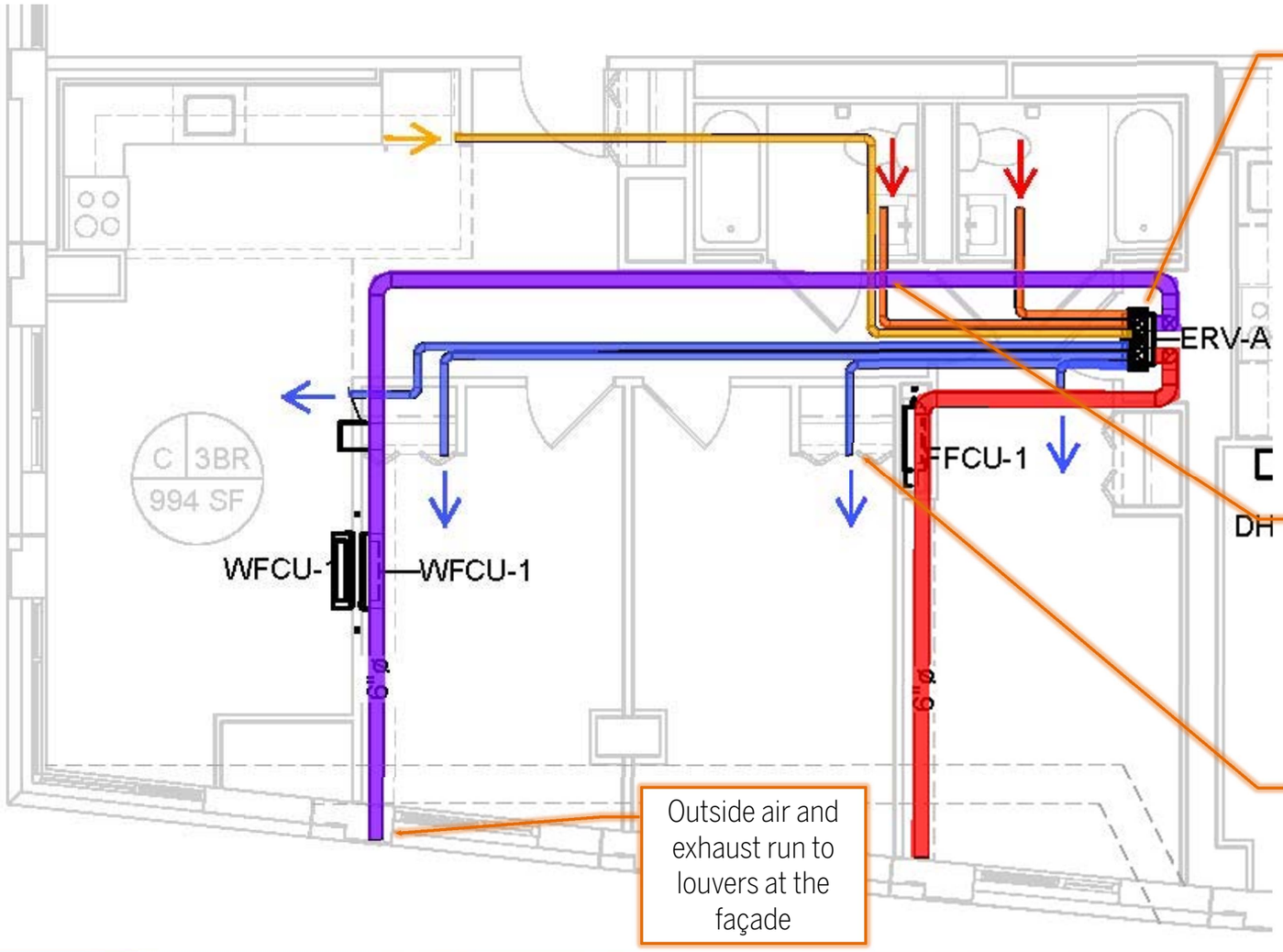
CENTRAL ERV DESIGN

425 Grand Concourse



CENTRAL ERV DESIGN

425 Grand Concourse



Units are located in small mechanical closets in each apartment to simplify maintenance

Ductwork crossings require increased floor to floor heights

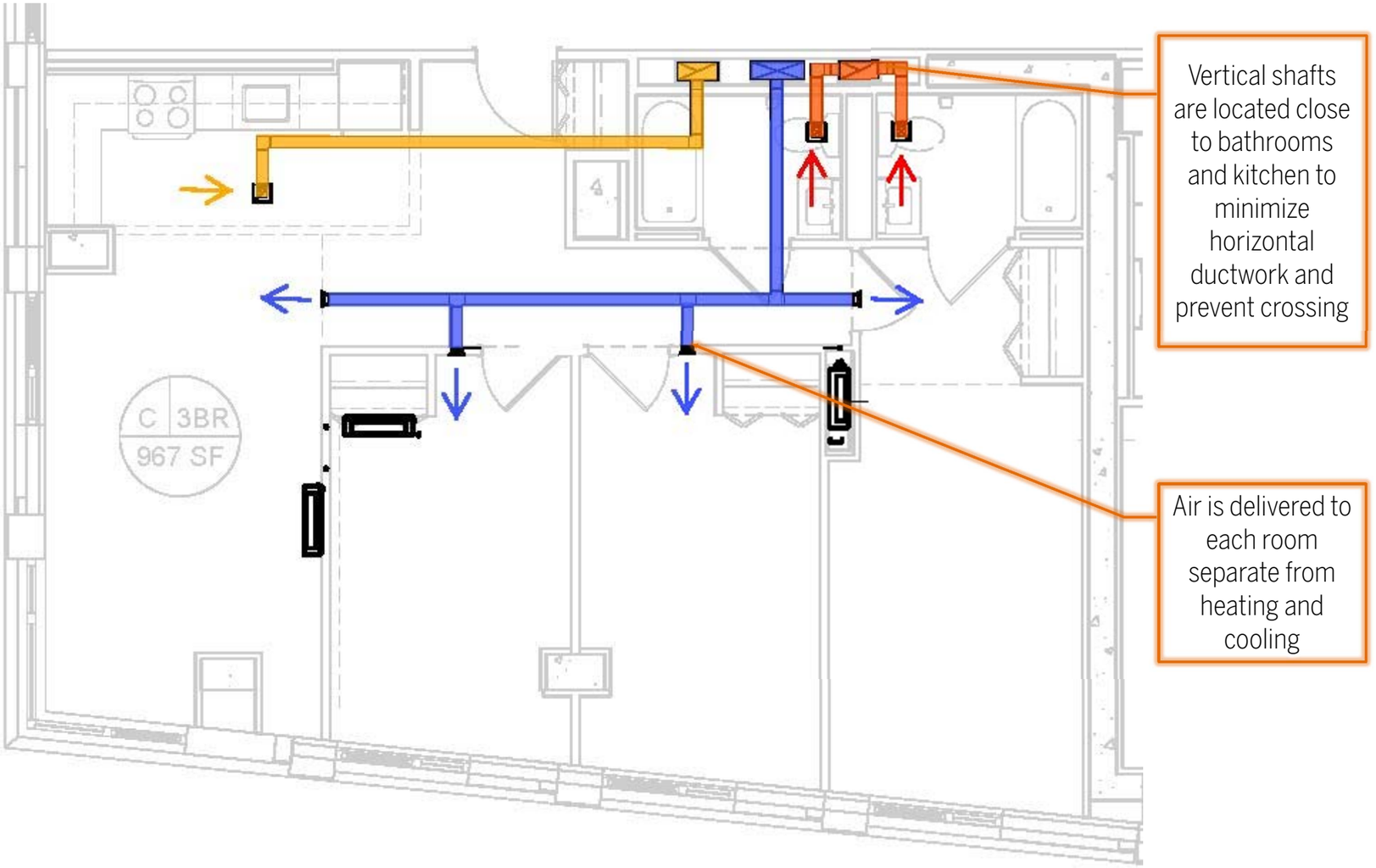
Air is delivered to each room separate from heating and cooling

Outside air and exhaust run to louvers at the façade

SUPPLY AIR
TOILET EXHAUST
KITCHEN EXHAUST
OUTSIDE AIR
EXHAUST AIR

CENTRAL ERV DESIGN

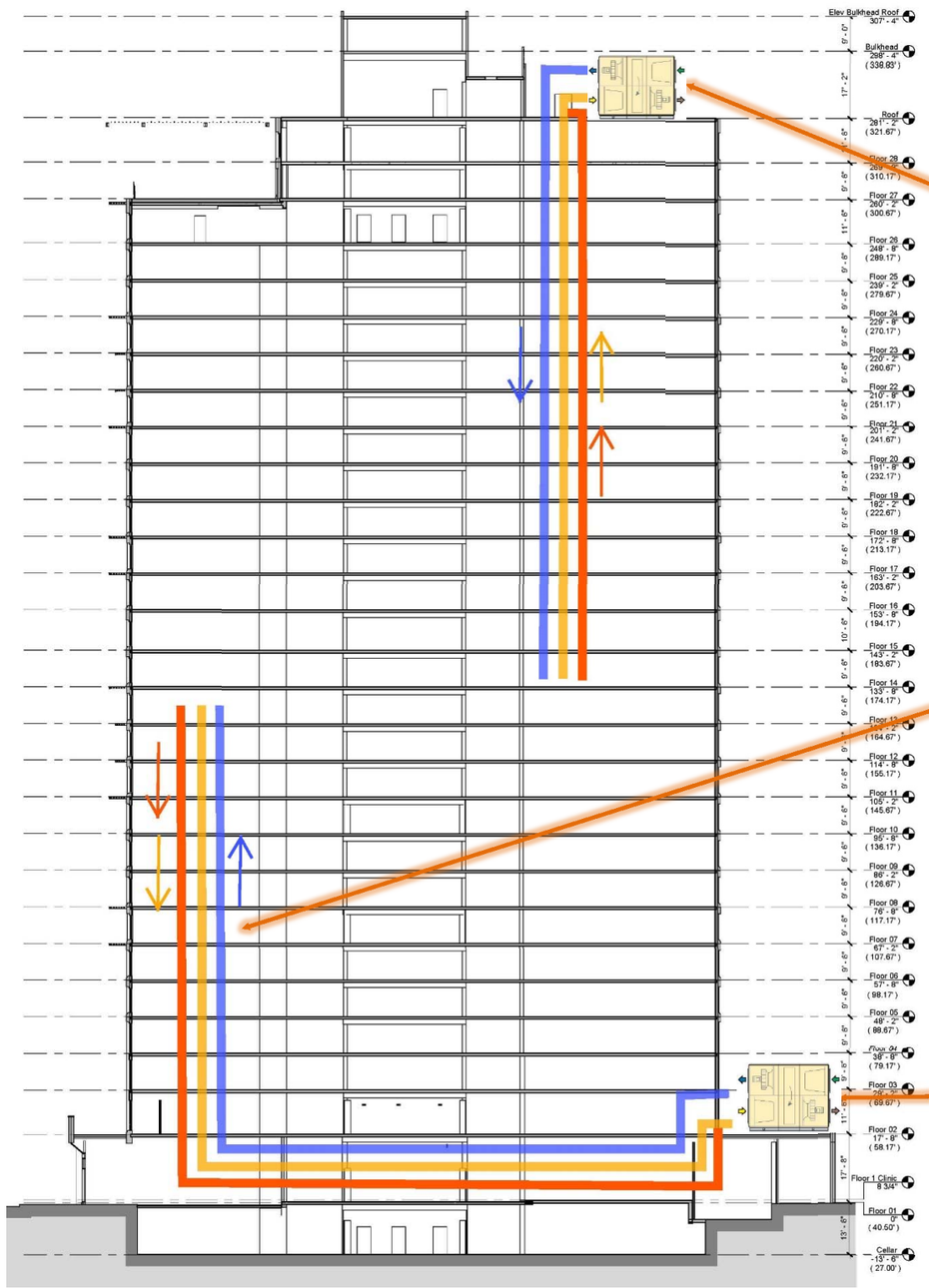
425 Grand Concourse



SUPPLY AIR
TOILET EXHAUST
KITCHEN EXHAUST

CENTRAL ERV DESIGN

425 Grand Concourse



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

SUPPLY AIR
TOILET EXHAUST
KITCHEN EXHAUST

INTERNAL MOISTURE CONTROL

INTERNAL MOISTURE - VENTILATION UNITS

ERV

PROS - SUMMER

- Keeps moisture our of interior spaces
- Cooling loads minimized

CONS - WINTER

- If internal moisture generation high, keeps moisture in

HRV

PROS - WINTER

- If moisture generation high, flushes moisture out of building

CONS - SUMMER

- Hight moisture exterior air brought indoors
- Cooling loads increased

CENTRALIZED ERV - UNIT HUMIDITY ANALYSIS

425 Grand Concourse

	3BR	2BR	2BR	1BR	St	1BR	3BR	2BR	2BR	1BR	St	1BR
	ERV-3						ERV-4					
Floor 26		Unit A	Unit M	Unit L	Unit N			Unit D	Unit E	Unit F	Unit G	Unit H
Floor 25			Unit M	Unit L	Unit K				Unit E	Unit F	Unit G	Unit H
Floor 24	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 23	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 22	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 21	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 20	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 19	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 18	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 17	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 16	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 15	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 14	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 13	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 12	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 11	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 10	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 9	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 8	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 7	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 6	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 5	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 4	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J
Floor 3	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M			
	ERV-1						ERV-2					

CENTRALIZED ERV - UNIT HUMIDITY ANALYSIS

425 Grand Concourse

	3BR	2BR	2BR	1BR	St	1BR	3BR	2BR	2BR	1BR	St	1BR	3BR	2BR	2BR	1BR	St	1BR	3BR	2BR	2BR	1BR	St	1BR
													ERV-3						ERV-4					
Floor 26														Unit A	Unit M	Unit L	Unit N			Unit D	Unit E	Unit F	Unit G	Unit H
Floor 25															Unit M	Unit L	Unit K				Unit E	Unit F	Unit G	Unit H
Floor 24													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 23													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 22													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 21													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 20													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 19													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 18													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 17													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 16													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 15													Unit B	Unit A	Unit M	Unit L	Unit K	Unit J	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H
Floor 14	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 13	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 12	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 11	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 10	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 9	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 8	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 7	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 6	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 5	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 4	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M	Unit L	Unit K	Unit J												
Floor 3	Unit C	Unit D	Unit E	Unit F	Unit G	Unit H	Unit B	Unit A	Unit M															
	ERV-1						ERV-2																	

CENTRALIZED ERV - UNIT HUMIDITY ANALYSIS

425 Grand Concourse

	3BR	2BR	2BR	1BR	St	1BR	3BR	2BR	2BR	1BR	St	1BR
Floor 14	Unit C 39%	Unit D 39%	Unit E 39%	Unit F 39%	Unit G 28%	Unit H 39%	Unit B 28%	Unit A 39%	Unit M 39%	Unit L 39%	Unit K 39%	Unit J 39%
Floor 13	Unit C 39%	Unit D 50%	Unit E 50%	Unit F 28%	Unit G 50%	Unit H 39%	Unit B 28%	Unit A 39%	Unit M 39%	Unit L 39%	Unit K 28%	Unit J 28%
Floor 12	Unit C 39%	Unit D 39%	Unit E 50%	Unit F 28%	Unit G 39%	Unit H 50%	Unit B 28%	Unit A 50%	Unit M 28%	Unit L 28%	Unit K 39%	Unit J 39%
Floor 11	Unit C 50%	Unit D 28%	Unit E 39%	Unit F 50%	Unit G 39%	Unit H 39%	Unit B 50%	Unit A 39%	Unit M 28%	Unit L 28%	Unit K 50%	Unit J 50%
Floor 10	Unit C 39%	Unit D 50%	Unit E 50%	Unit F 50%	Unit G 50%	Unit H 39%	Unit B 39%	Unit A 39%	Unit M 28%	Unit L 39%	Unit K 39%	Unit J 39%
Floor 9	Unit C 39%	Unit D 28%	Unit E 39%	Unit F 28%	Unit G 39%	Unit H 50%	Unit B 28%	Unit A 28%	Unit M 28%	Unit L 39%	Unit K 28%	Unit J 39%
Floor 8	Unit C 39%	Unit D 50%	Unit E 50%	Unit F 50%	Unit G 50%	Unit H 39%	Unit B 28%	Unit A 39%	Unit M 28%	Unit L 28%	Unit K 50%	Unit J 28%
Floor 7	Unit C 50%	Unit D 28%	Unit E 50%	Unit F 28%	Unit G 50%	Unit H **50%**	Unit B 28%	Unit A 50%	Unit M 28%	Unit L 39%	Unit K 39%	Unit J 39%
Floor 6	Unit C 39%	Unit D 28%	Unit E 39%	Unit F 28%	Unit G 39%	Unit H 50%	Unit B 50%	Unit A 39%	Unit M 28%	Unit L 39%	Unit K 28%	Unit J 39%
Floor 5	Unit C 50%	Unit D 28%	Unit E 50%	Unit F 28%	Unit G 50%	Unit H 39%	Unit B 39%	Unit A 28%	Unit M 28%	Unit L 39%	Unit K 50%	Unit J 39%
Floor 4	Unit C 50%	Unit D 39%	Unit E 50%	Unit F 39%	Unit G 39%	Unit H 39%	Unit B 50%	Unit A 39%	Unit M 28%	Unit L 39%	Unit K 39%	Unit J 28%
Floor 3	Unit C 28%	Unit D 50%	Unit E 50%	Unit F 50%	Unit G 50%	Unit H 50%	Unit B 28%	Unit A 50%	Unit M 50%			
	ERV-1						ERV-2					
	42%	38%	46%	37%	44%	44%	35%	40%	32%	36%	39%	37%
Blended Humidity			42%						37%			

Humidity Load Legend

	Low	Medium	High
People	0.2250	0.4208	0.6167
Pets	0.0150	0.0225	0.0300
Plants	0.0124	0.0217	0.0310
Showers	0.7125	1.0823	1.4520
Cooking	0.5300	0.5300	0.5300
Total	1.4949	2.0773	2.6597
	28%	39%	50%