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Retrofit Reality Check: Lessons from Real-World Projects

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Moderator Bio

Annie K. Lo, AIA, REWC, LEED AP

Manging Director & Senior Principal

Walter P Moore

San Francisco, CA

Annie Lo is Co-chair of RAiNA's Retrofit Committee. She is a Senior Principal and Managing Director of the Diagnostics Group of Walter P Moore in San Francisco. Annie is a licensed Architect in nine states and is a Building Enclosure Consultant and waterproofing expert. She leads Walter P Moore's West Region Team in their evaluation of exterior wall façade and rainscreen systems, plaza and roofing assemblies, and below-grade waterproofing. She is Past President of the Western Chapter of the Association for Preservation Technology (APT) and is on the Board of Directors for the International Concrete Repair Institute (ICRI) Northern California Chapter. Annie graduated with degrees in Architecture from Columbia University in New York and Cal Poly San Luis Obispo. She is also a LEED Accredited Professional and a Registered Exterior Wall Consultant (REWC) credentialed by the International Institute of Building Enclosure Consultants (IIBEC).

Panelist Bio

Alex Moshenberg
Building Envelope Specialist
Metro Building Solutions, Inc.
New York, NY

Alex Moshenberg is a Building Envelope Specialist with Metro Building Solutions, Inc. (MBSI), a manufacturer's representative firm specializing in high-performance building envelope systems. With over 19 years of technical management experience in commercial façades, Alex collaborates closely with leading rainscreen manufacturers to deliver beautiful, durable, cost-effective, and code-compliant solutions for both new construction and retrofit projects. He also serves as Co-Chair of RAiNA's Rainscreen Retrofit Committee, guiding industry best practices and promoting effective retrofit strategies.

Panelist Bio

Anthony Wetterau is Vice President and part-owner of Lawrence Exterior Restoration Corp. and Tindel Replacement Windows. A licensed Professional Engineer in New York with over 20 years of experience in the building-enclosure industry, he specializes in façade modernization, rainscreen technology, and deep-energy retrofits. Anthony has led large-scale restoration projects on occupied high-rise buildings and is active in RAiNA's Retrofit Committee, advancing best practices in enclosure performance and retrofit delivery frameworks.

Anthony Wetterau, PE
Vice President
Lawrence Exterior Restoration Corp.
New York, NY

Panelist Bio

Mr. Forst is FCA's founding partner overseeing building envelope design for new construction and restoration of existing and landmark buildings. In addition to consulting on new work, Mr. Forst has experience in forensic investigations involving hurricane, fire, and glass breakage damage to building exteriors and has been the architect of significant envelope over-cladding and performance retrofit projects. Ralph is a member of American Institute of Architects (AIA) NY Chapter, American Architectural Manufacturer's Association (AAMA), Cal OES Safety Assessment Program (SAP) Evaluator. Speaking engagements include IIBEC NY Metro, NACE International, and ICRI NY Chapter.

Ralph Forst
Principal
Forst Consulting and Architecture, PLLC
New York, NY

Abstract

The existing-building stock ages, converting legacy façades to true rainscreen assemblies is emerging as the lowest-carbon path to envelope resilience.

In this 90-minute panel discussion, RAiNA's Retrofit Committee assembles three diverse case studies—a mid-rise co-op apartment building, late 1960s school building, and a high-rise apartment tower—to reveal where rainscreen retrofits succeed and stumble.

Moderator Annie Lo guides a discussion of project challenges and successes, then pivots to the work of RAiNA's Retrofit Committee: newly harmonised retrofit definitions, a sneak-peek at the forthcoming *RAiNA Retrofit Guideline*, and sample retrofit wall assemblies ready for design teams.

Attendees will leave with practical knowledge that bridges diagnostics, design, and construction, supported by real-world case examples.

Learning Objectives

1. Identify rainscreen retrofits, including re-clad, re-skin, and overclad, and their applicability to different building types.
2. Summarize primary drivers of rainscreen retrofit projects, including building performance issues, energy efficiency, code compliance, occupant comfort, and building repositioning through case study examples.
3. Evaluate common challenges and solutions related to existing exterior wall assemblies and application of rainscreen retrofit strategies.
4. Apply RAiNA Retrofit Guidelines, sample wall assemblies, and definitions to streamline your own rainscreen retrofit scope and approach.

Retrofit Committee - Overview

- **Why now?**: Repositioning pressure of existing building, aging building stock, Energy and carbon emissions goals, demand for building and rainscreen retrofits
- **Mission**: Practical guidance for assessment of existing structures → planning for retrofit designs → implementation of rainscreen retrofits
- **Committee Initiatives & Progress**:
  - ***Definitions***
  - ***Case Studies***
  - ***Graphics Visual Working Group***
  - ***Guideline Document (version 1.0)***

Retrofit Committee - Definitions

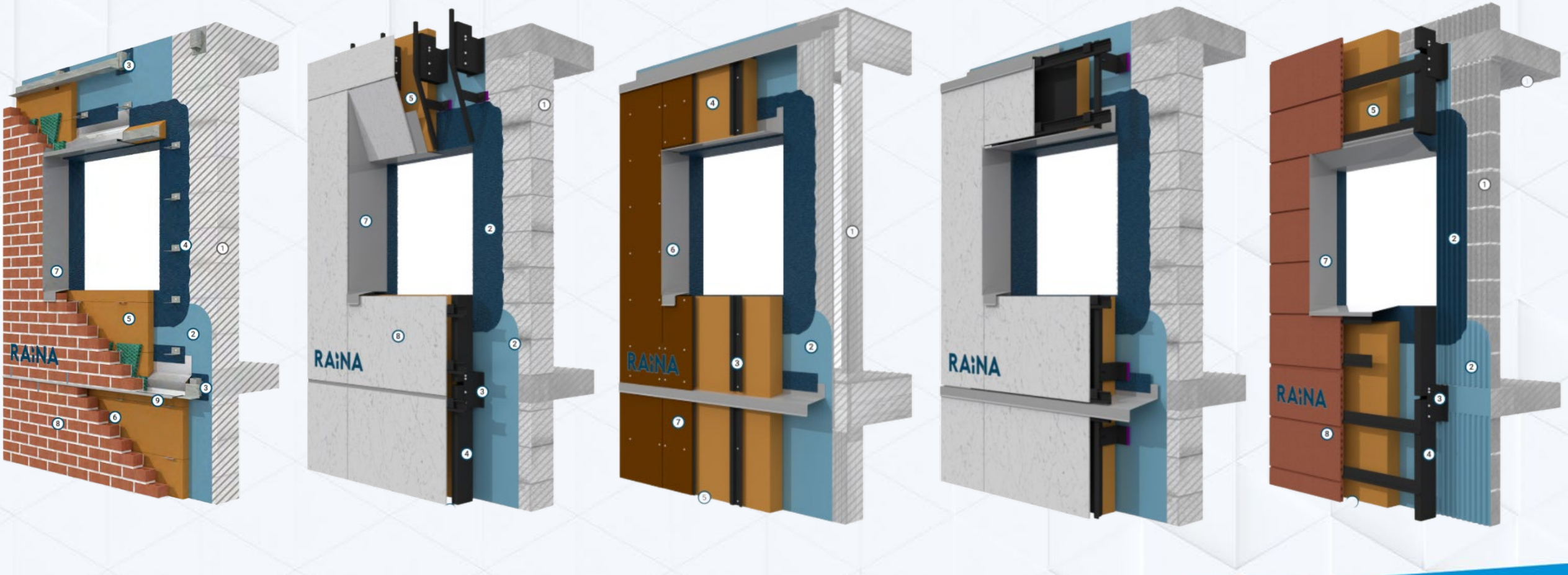
Rainscreen Retrofit: Modification of an existing exterior wall assembly that includes the addition of, or changes to, rainscreen components.

Rainscreen Reclad: Replacement of cladding and components specific to cladding on an existing rainscreen assembly.

Rainscreen Overclad: installation of cladding and other wall assembly components over an existing exterior finish, including cladding, where present, to create a rainscreen assembly.

Retrofit Committee - Case Studies Updates

Retrofit Committee - Graphics Visual Working Group Updates



Retrofit Committee - Guideline Document

RETROFIT REALITY CHECK: LESSONS FROM REAL-WORK PROJECTS

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Case Study No. 1 - 211 East 70th, New York

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Rainscreen Overcladding – Completed 2019
Owner: Rudin Management Co.
Year built: 1970
Construction Manager: E&A Restoration
Multiple Prime Contracts

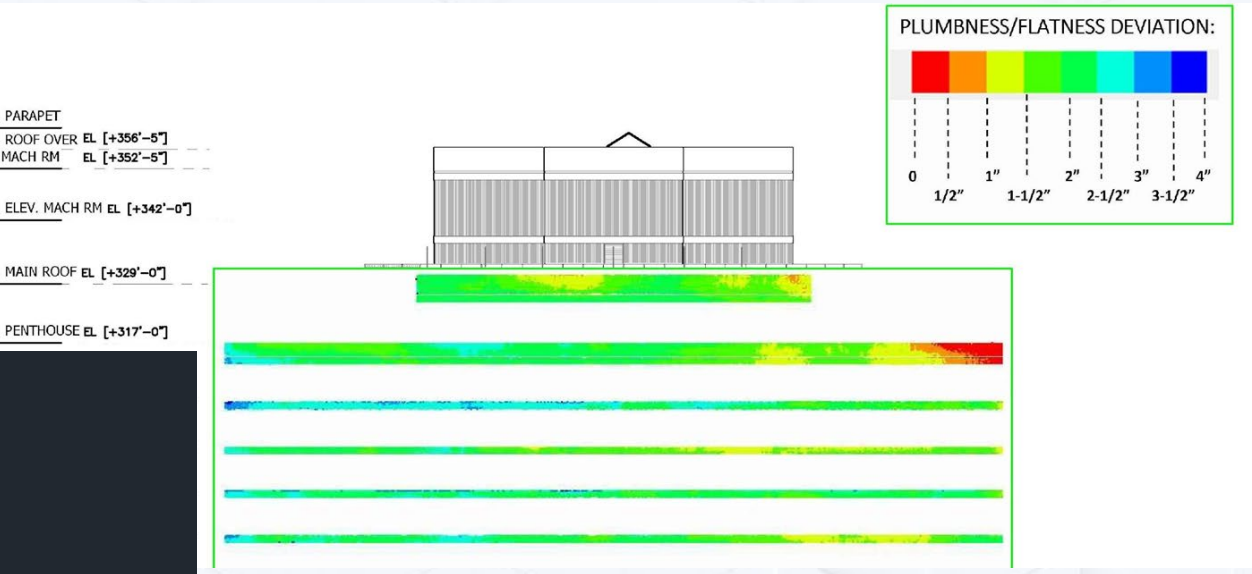
Case Study No. 1 - 211 East 70th, New York

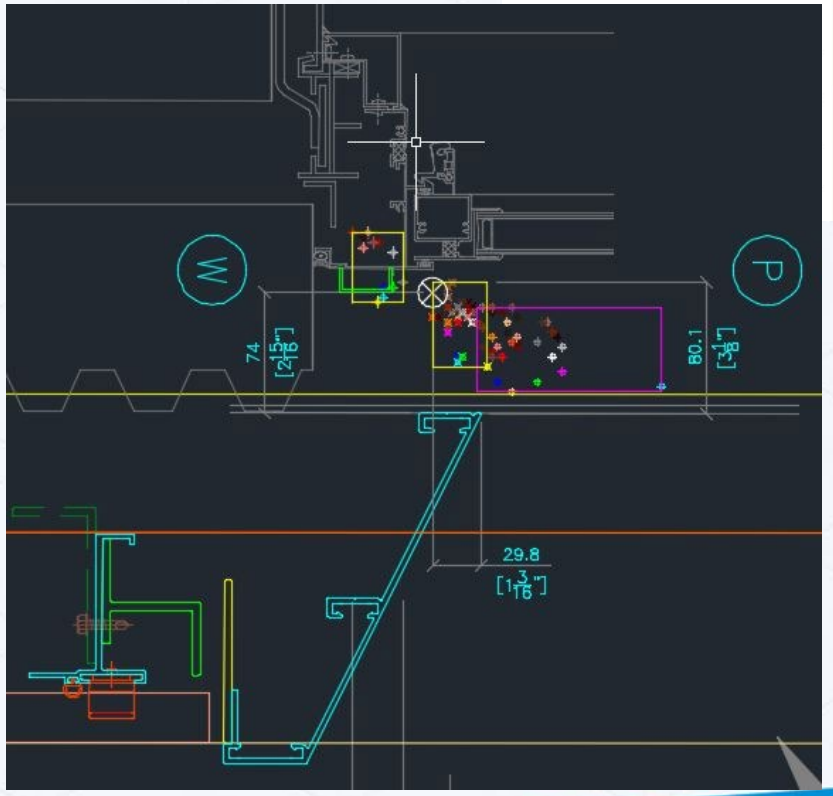
Scope of work:

- Repair and coat existing masonry wall
- Layout and Install new vertical carrier tracks
- Install new window surrounds and PTAC grilles
- Install exterior Rockwool insulation
- Install terra cotta tile

Design by SOM NY

Case Study No. 1 - 211 East 70th, New York





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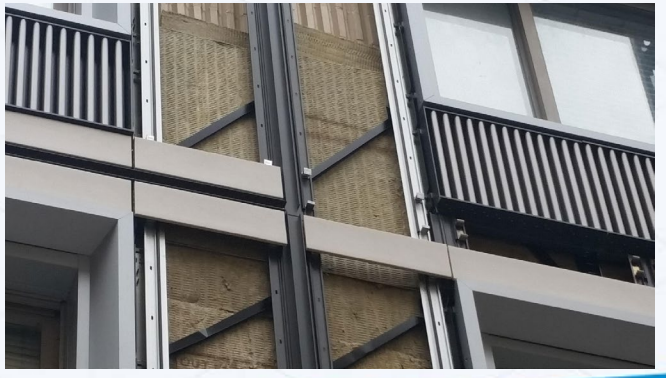


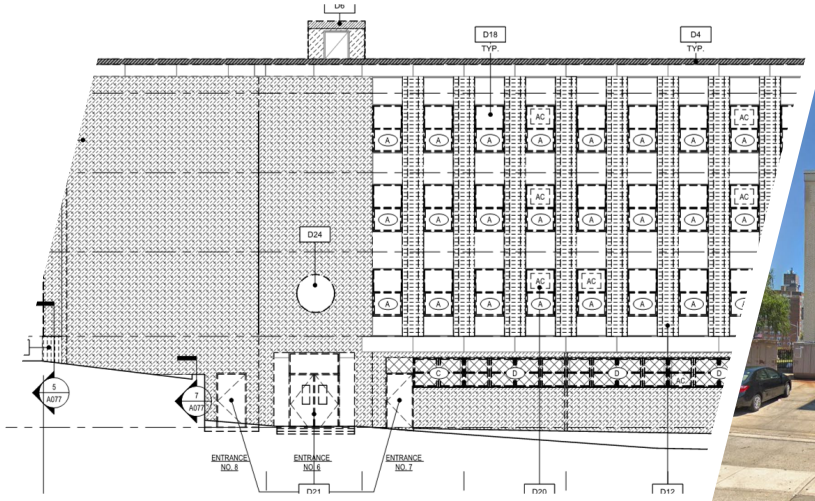
Case Study No. 1 - 211 East 70th, New York

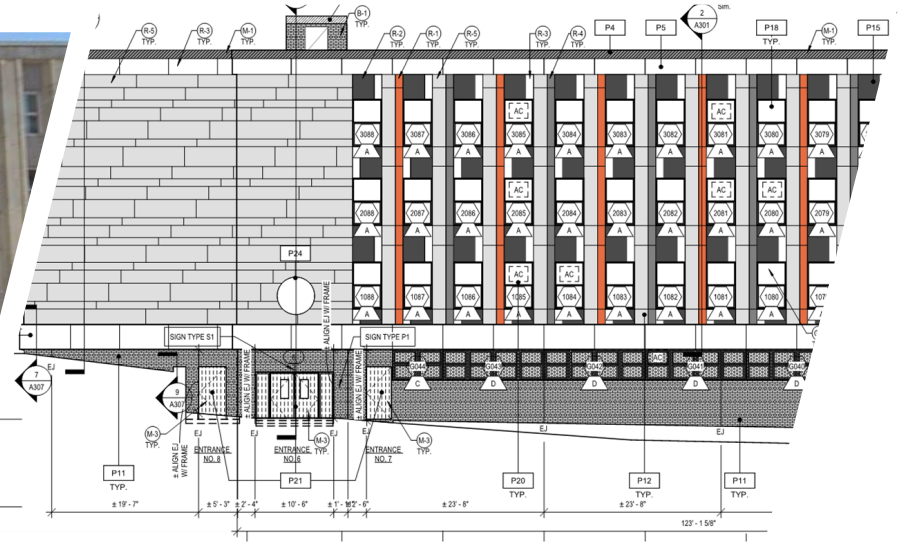
Case Study No. 2 - School PS 238Q

Case Study No. 2 - School PS 238Q

Rainscreen Retrofit and Window Replacement

Owner: Public School System
Contract Amt: ~$20M
Area: ~50-60,000SF of façade
Building Age/Height: 1970s / 4-story
The Work: completed over summer and after hours





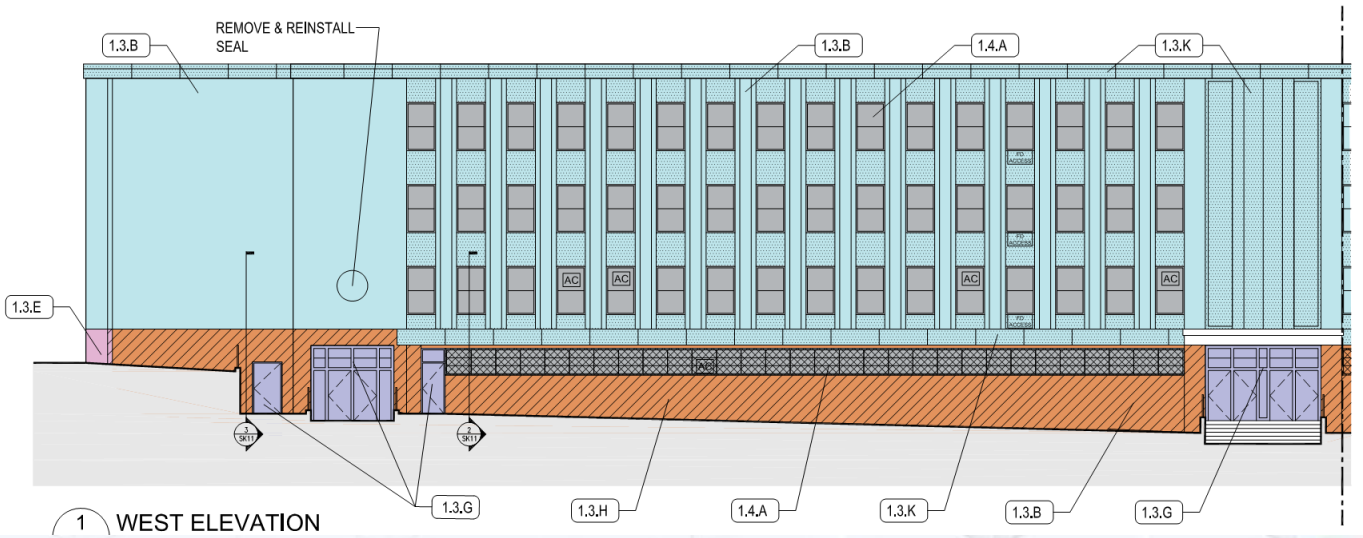
Case Study No. 2 - School PS 238Q

Scope of work:

- Remove all existing veneer brick
- Parge backup wall
- Install new WRB and insulate back-up masonry
- Furnish and install HD Swisspearl Fiber Cement rainscreen cladding system with 6” of insulation
- Achieve effective R30 for opaque wall
- Replace roofing
- Rebuild parapets
- Shift windows out to better align with CI plane

KEYNOTE LEGEND

COLOR	NUMBER	DESCRIPTION
INSULATED BRICK CAVITY OVER EXISTING CMU / INSULATED FIBER CEMENT RAINSCREEN SYSTEM	1.3.B	REMOVE ALL BRICK, ANCHORS DOWELS AND FLASHING AT THE EXTERIOR FACADES. FILL JOINTS OF BACK UP MASONRY AND COLLAR JOINT WITH MORTAR, PROVIDE NEW ANCHORS AND TIES. CREATE AN INSULATED CAVITY AND PUT NEW BRICK IN PLACE ON NEW CONCRETE CORBEL. UPPER FLOORS TO RECEIVE INSULATED FIBER CEMENT RAINSCREEN SYSTEM (SEE SK11). REMOVE AND REPLACE EXTERIOR LIGHTING AND LETTER SIGNAGE. REMOVE AND REINSTALL CAMERAS, NYC SEALS, AND OTHER DEVICES.
	1.3.C	REMOVE ALL BRICK, ANCHORS DOWELS AND FLASHING AT COURTYARDS AND BULKHEADS. REPLACE WITH INSULATED FIBER CEMENT RAINSCREEN SYSTEM.
	1.3.E	RESET WITH NEW STONE FASTENERS, REMORTAR, AND RESEAL EXISTING CORNER PIECE.
	1.3.F	REMOVE PRECAST CONCRETE TOWER WINDOWS AND REPLACE WITH CURTAIN WALL SYSTEM.
	1.3.G	REPLACE LINTELS, DOORS AND FRAMES ENTIRELY WITH NEW.
	1.3.H	PROVIDE NEW ANTI-GRAFFITI COATING AT NEW BRICK AT ALL FACADES.
	1.3.K	EXISTING PRECAST TO REMAIN. INSTALL RAINSCREEN PANEL SYSTEM OVER PRECAST.
	1.4.A	REMOVE AND REPLACE ALL LINTELS, WINDOWS, WINDOW GUARDS (IF ANY), AND WINDOW SHADES WITH NEW.
		INDICATES AREA OF SECURITY BARRIERS TO BE REMOVED AND REPLACED.
AC		INDICATES LOCATION OF EXISTING AC WINDOW UNITS TO BE REMOVED AND REINSTALLED IN NEW WINDOW SYSTEM.



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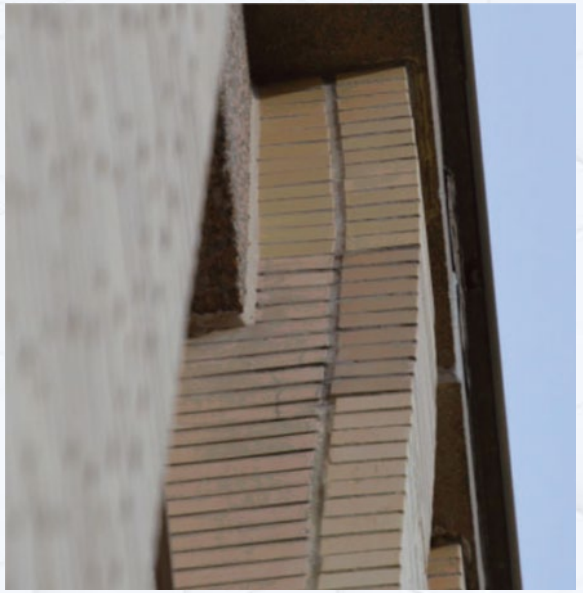
Relieving Angles and Lintels

- Probes show spalled and corroded reliving angles and lintels
- Inconsistencies with existing structure (brick, cmu, steel)



Existing Brick

- Failing brickwork
- Out of plumb
- Failing caulk joints

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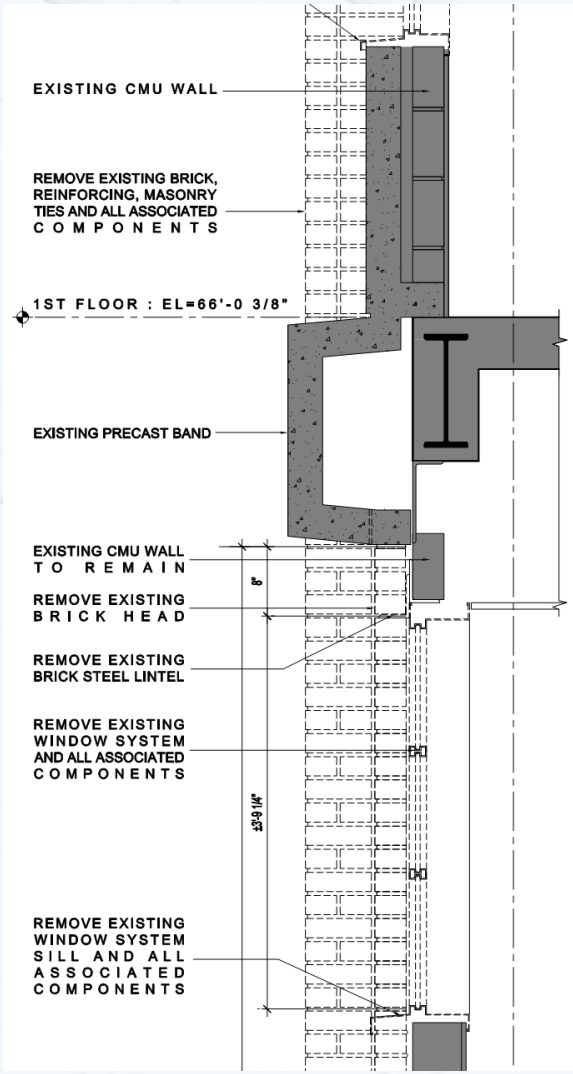
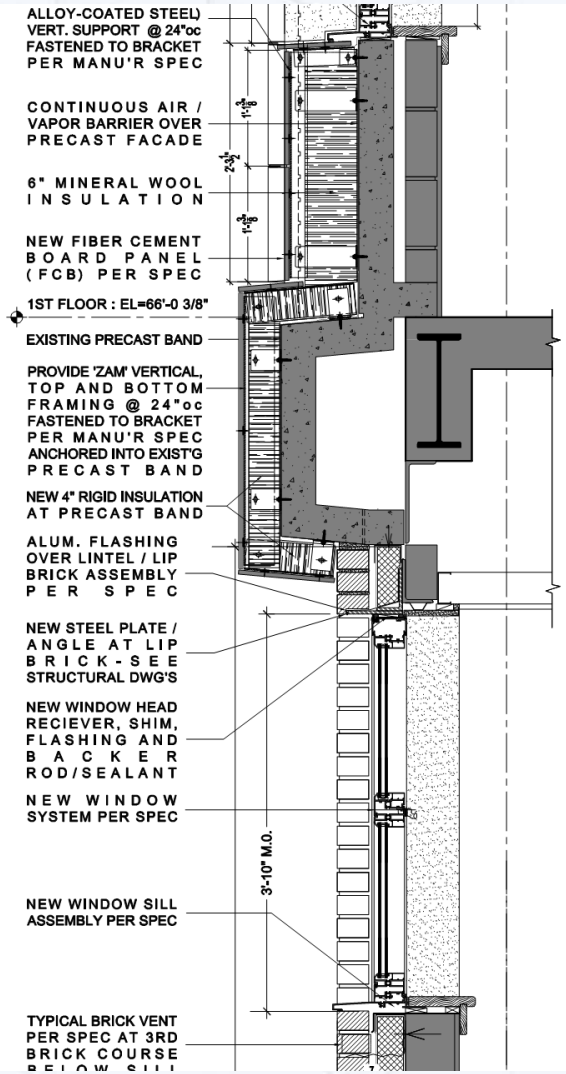


Old Wall



New Wall

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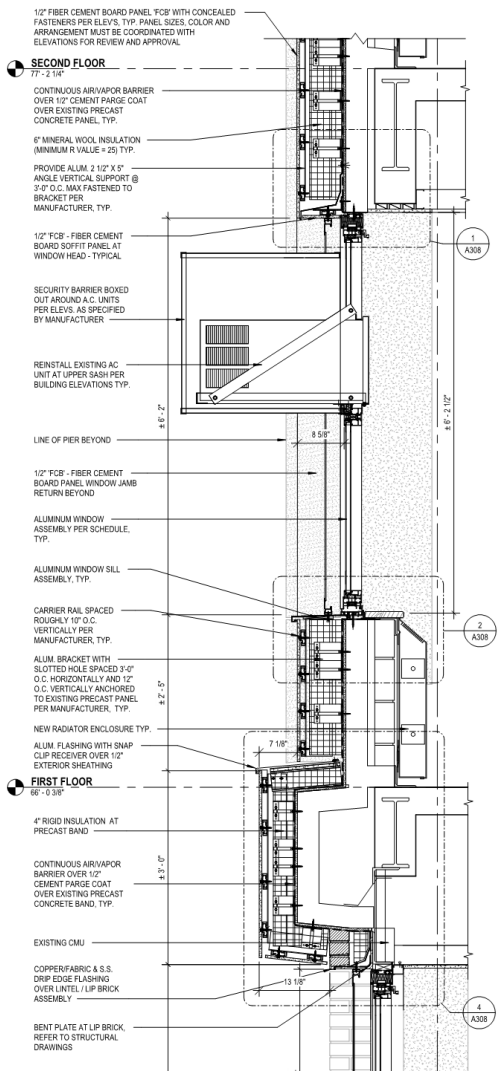
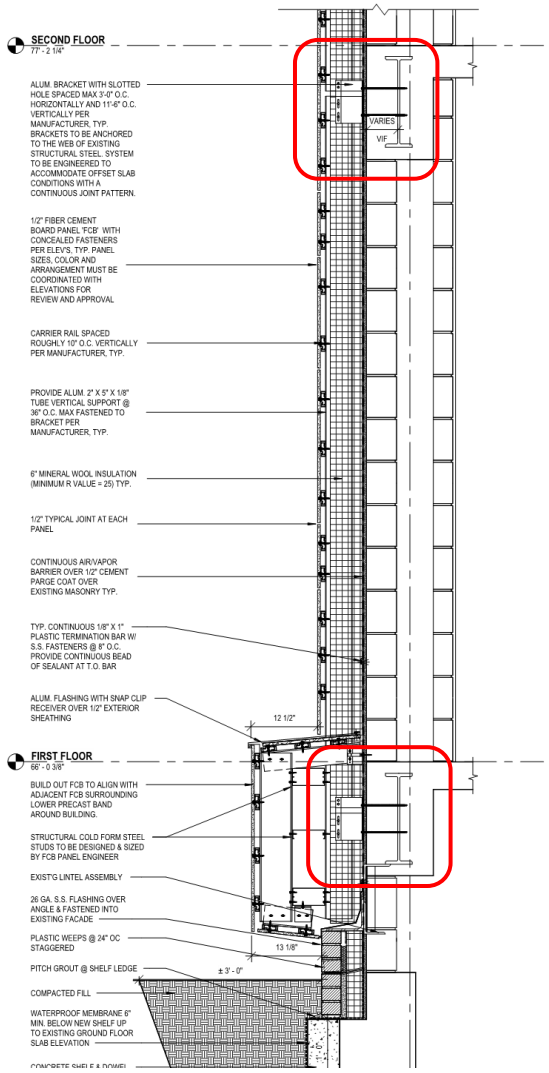


Intermittent Bracket System



Floor-To-Floor Attachment

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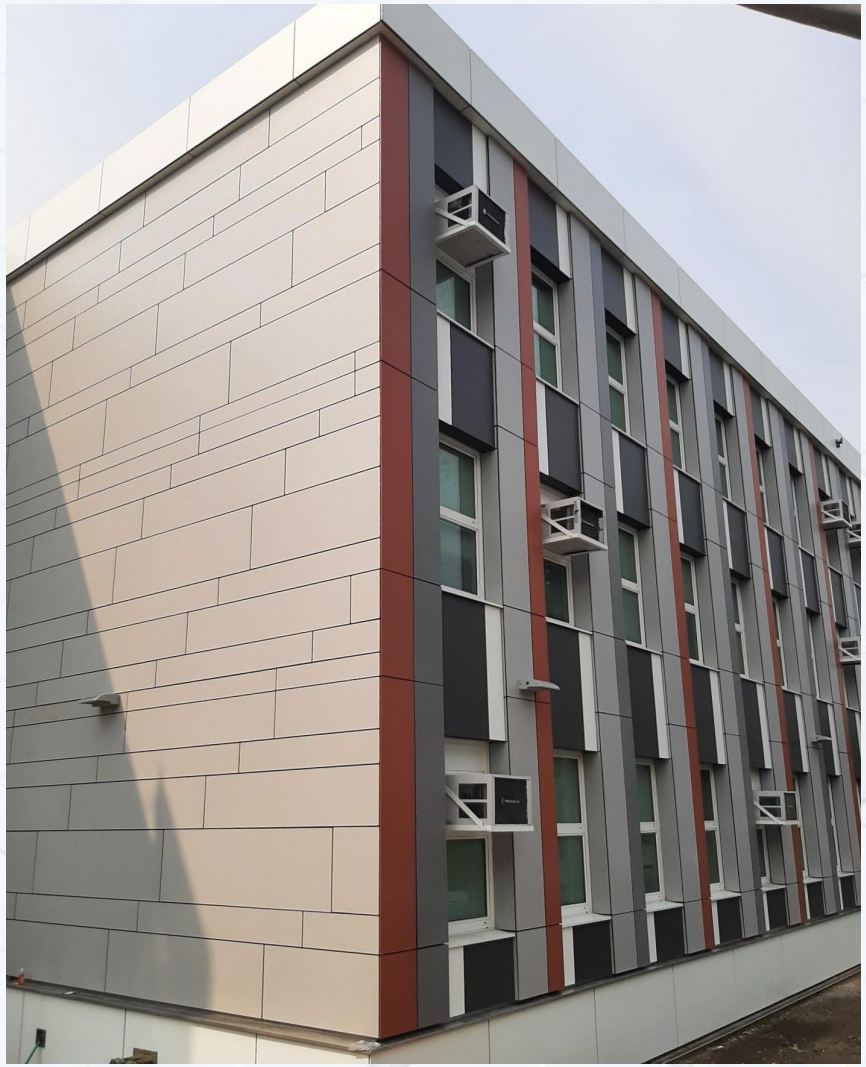

Case Study No. 3 - 201 East 79th, New York

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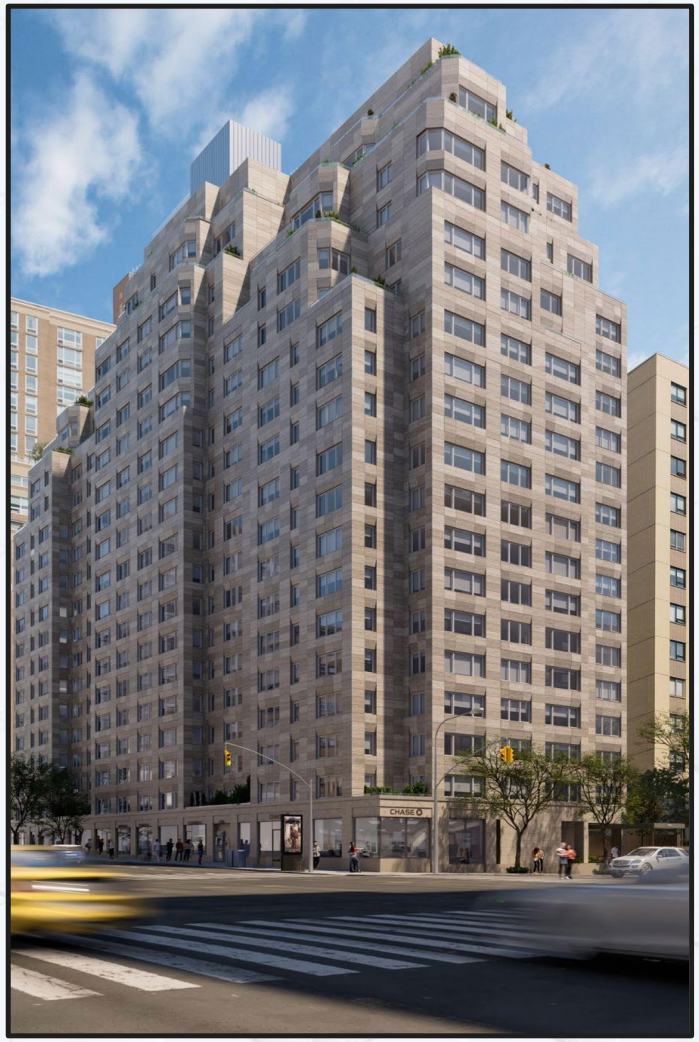
Rainscreen Retrofit
Partial Window Replacement

Owner: Condo
Contract Amt: $20M
Apartments - Fully occupied



Scope of work:

- Remove all existing veneer brick
- Parge, waterproof and insulate back-up masonry
- Furnish and install porcelain rainscreen cladding system
- Fabricate and install custom metal trim
- Replace terrace roofing
- Rebuild parapets / install new glass railing

Case Study No. 3 - 201 East 79th, New York

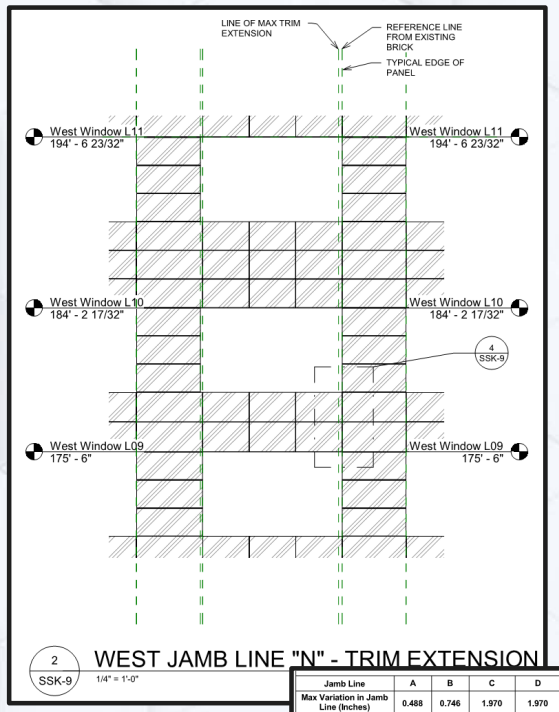
Demo / Unforeseen Conditions

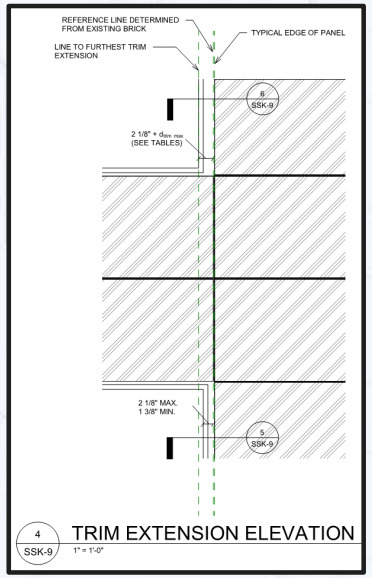
- Large voids in non-structural CMU back-up wall
- Substantial discrepancies with existing concrete structure
- Projection of existing windows to remain into cavity

Patching / Waterproofing

- Consolidation and parging of back up masonry
- Fluid applied air moisture barrier and window flashings
- Leak free for 12+ months prior to cladding install

Case Study No. 3 - 201 East 79th, New York





Jamb Line	A	B	C	D	E	F	G	H	K	L	M	N	O	P	Q
Max Variation in Jamb Line (Inches)	0.488	0.746	1.970	1.970	1.439	1.534	0.962	0.801	1.668	1.411	3.169	3.562	1.279	1.273	0.995
Max Joint Jog (inches) (djog_max)	0.000	0.000	0.583	0.839	0.438	0.000	0.212	0.051	0.642	0.000	1.748	1.250	0.020	0.352	0.245
Location of Jog in Panel Line			W-C-2-F	W-D-14-F	W-E-2-F		W-G-7-F	W-H-12-F	W-K-3-F		W-M-16-F	W-N-2-F	W-O-7-F	W-P-2-F	W-Q-10-F
			W-C-3-F	W-D-12-F	W-E-4-F		W-G-3-F		W-K-2-F		W-M-15-F	W-N-3-F		W-P-3-F	W-Q-11-F
			W-C-4-F	W-D-11-F	W-E-3-F		W-G-9-F		W-K-4-F		W-M-12-F	W-N-4-F			
											W-M-11-F				
											W-M-14-F				
											W-M-10-F				

Panel Schedule 19th-Pent - FC_W** (Shop Cut Height plus Miter)

Floor	Elevation	Cutting Parameter	Quantity	Width	Height
19th	South	FC_W**		3 0' - 9 15/16"	1' - 9"
19th	North	FC_W**		3 1' - 2 1/4"	1' - 9"
19th	North	FC_W**		3 1' - 2 9/16"	1' - 9"
19th	North	FC_W**		3 1' - 10 1/4"	1' - 9"
20th	West	FC_W**		1 1' - 11 9/16"	1' - 6 5/16"
20th	South	FC_W**		1 2' - 1 3/8"	1' - 6 5/16"
20th	West	FC_W**		1 2' - 5 11/16"	1' - 6 5/16"
20th	West	FC_W**		2 2' - 9 7/8"	1' - 6 5/16"
20th	South	FC_W**		1 2' - 10 13/16"	1' - 6 5/16"
20th	West	FC_W**		1 2' - 11 3/16"	1' - 6 5/16"
20th	West	FC_W**		1 3' - 0"	1' - 6 5/16"

Existing window analysis

- Evaluate existing laser scan survey data by owner
- Statistical “line of best fit” study for vertical tile joints
- New window trim size varies at each opening

Cutting / Labeling / Storage

- Coordination and management of over 17,000 individual tiles
- Custom sized according to existing windows to remain
- Management of cutting lists/packaging/sorting/labeling

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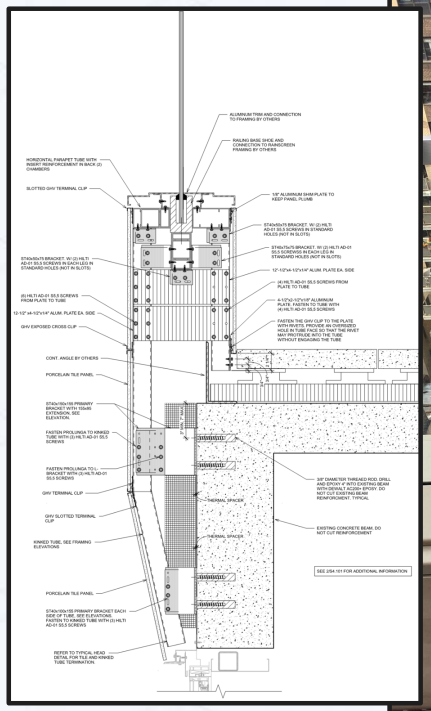

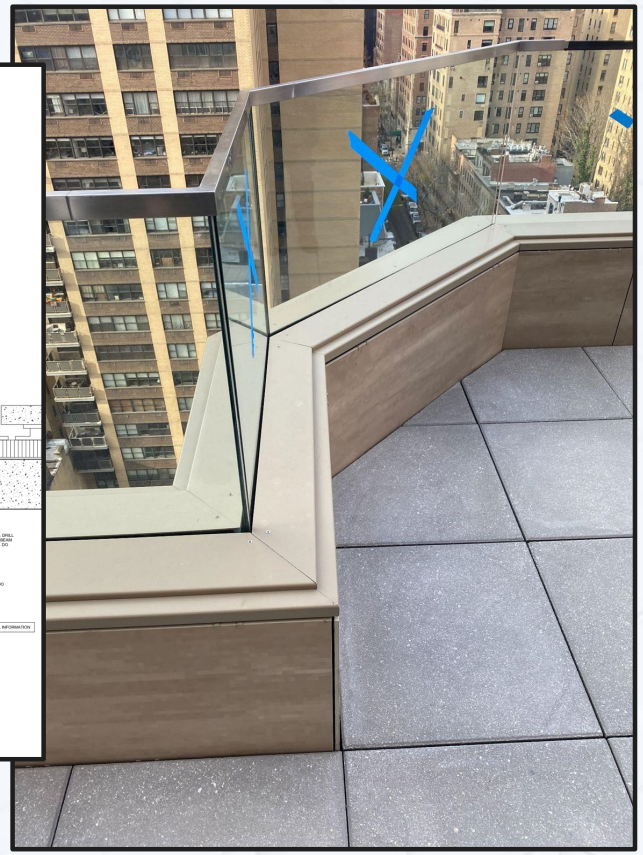

Sub-framing / Insulation

- Alumin. tubes/brackets supplied by cladding manuf.
- Attachment to concrete structure only
- Coord. of detail changes at atypical conditions

Terrace Parapets / Railings

- Rebuild all terrace parapets with new cladding framing
- Engineer parapets to carry load of new guardrails
- Frameless glass rail to maximize sightlines

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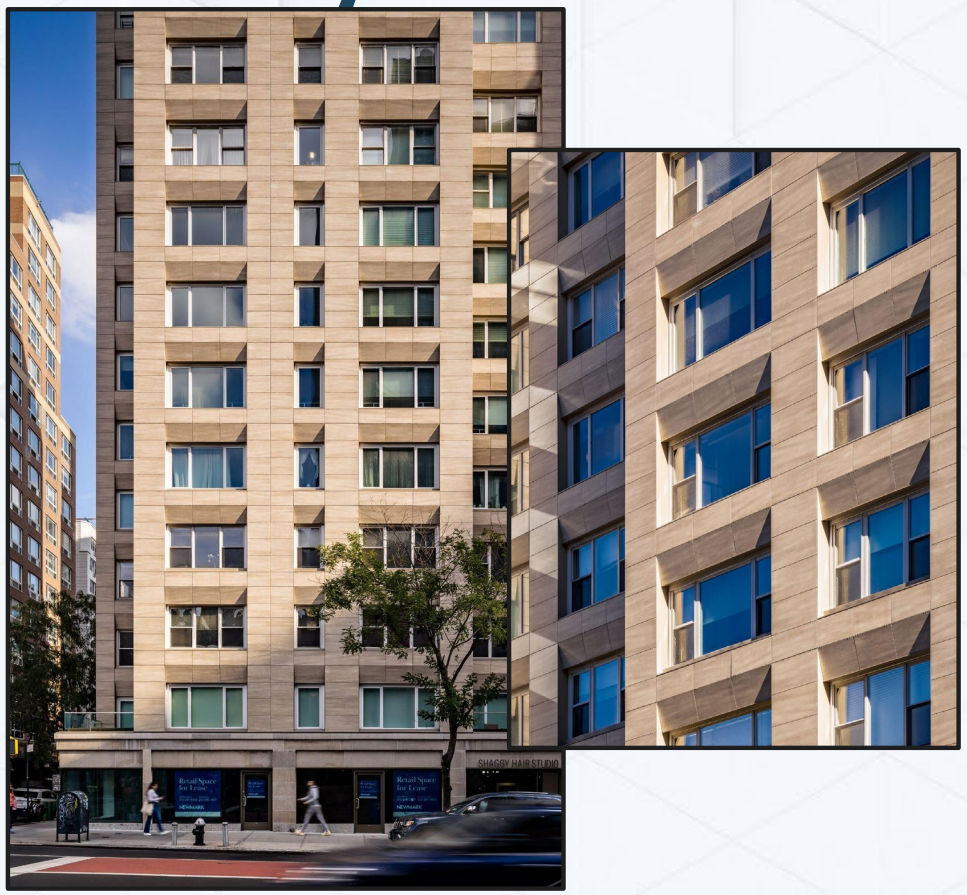

Porcelain Installation

- Custom painted exposed tile clips
- Oblique tiles at window heads/bay windows
- Custom trim/closure metal around existing window

Phased Scaffold Removal

- Running punch lists and sign-off of discrete zones
- Allows for scaffold removal by zone/elevation

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BEFORE

- Continuous safety concerns and water/air leaks
- 5 year repeating costs for brick maintenance - scaffolding
- Tenant complaints and poor energy performance

AFTER

- Non-staining porcelain cladding panels (~10mm thick)
- All non-ferrous metal components
- 40%+ improvement in energy efficiency / reduction of costs
- Open jointed rainscreen - minimal maintenance

Overall Questions for Panelists

QUESTION & ANSWER PERIOD

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Speaker & Presentation Evaluation

Retrofit Reality Check

THANK YOU!

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