Exterior photos courtesy of Macklowe, interior photos by Colin Miller

ONE WALL STREET:

A LARGE-SCALE LUXURY CONVERSION IN A HISTORIC URBAN ENVIRONMENT

By Mark Plechaty, PE, Managing Principal – DeSimone Consulting Engineering

The constant transformation of the city over time barely elicits notice from New York City urbanites these days. But, even for those inured to the ebb and flow of buildings and lots across the vast grid of city streets, the office-to-residential conversion of the landmarked One Wall Street stands out as an exceptional feat of engineering innovation.

The transformation of this Art Deco masterpiece to residences — the largest such historic conversion in New York City when completed — was far from business as usual. As the lead structural engineer, I've never been involved in a project quite like it.

Located in the heart of lower Manhattan's Financial District, the original 1931 office tower and its 1965 annex were transformed into luxury condominiums through the vertical addition of six floors at the top and 175,000 square feet of retail at its street-level base — and so much more. While this may sound simple, only a great measure of technical ingenuity, in balance with a deep respect for architectural heritage, could make the reimagining and retrofit of One Wall Street a reality.

Like so many other iconic, early 20th century New York City office buildings, One Wall had become an outdated behemoth that had ceded its market edge to newer, shinier towers in lower Manhattan. The original, 50-story, limestone-clad tower and its 30-story steel-framed annex totaled 1.6 million square feet over a full city block — including five basement levels that once guarded gold bullion in a massive vault 72 feet below the building.

But in 2014, developer Harry Macklowe, owner of Macklowe Properties, purchased One Wall with a laser-focused vision to convert its many

office floors into the highest-end residential units and luxe retail — and give the landmark a brilliant, age-defying second act.

The challenges to moving forward, however, were many. For starters, the NYC Landmarks and Preservation Commission had imposed restrictions on exterior modifications when it designated the original tower, designed by Ralph Walker for the Irving Trust Bank, as a landmark back in 2001. While the extensive redesign of most of the building's interior remained in play, the protected status of its fluted exterior added a significant layer of complexity to the project.

Other monumental challenges included determining the limits of these older structures to support six additional residential floors and a rooftop pool, and how to get past those limits. A looming question was whether the existing foundations, steel beams and concrete slabs could withstand the countless invasive interventions needed to radically reshape the interior spaces and base for luxury living and retail. Add to these challenges a tight urban site that itself lay within the boundaries of a historic district, flanked by an active subway station and other landmarked buildings.

Given this array of challenges, my team embraced from the outset that nothing short of creative, out-of-the-box thinking could assure the integrity of the structures, preserve and restore the historic facades, and reimagine One Wall for modern, luxury living.

Structural Modifications to the Tower

We dove in at the deep end. Collaborating closely with Macklowe and SLCE Architects, we focused on the most critical challenge, upon which the project's success ultimately depended: how to add six new floors and a pool atop the 30th floor of the1965 annex to create a 36-story tower.

Here's how. The annex building — a steel moment frame with concrete-encased beams and concrete slabs — would become significantly taller and heavier, and needed to meet wind loads under the current code. Combined with the removal of two lower floors, the engineering team needed to significantly fortify the structure, known as stiffening, as additional height was added to the building.

To ensure that the additional height and associated weight did not destabilize the structure, particularly with a weakened base due to the removal of lower floors, the DeSimone structural team designed a stiffening system that incorporated high-performance materials to control the effects of wind sway — and support the added mass at the top.

To meet zoning requirements, the new overbuild levels were required to set back,

referencing the "wedding cake" setbacks of the Art Deco architecture and original annex building just below. But a complication arose. Because of this new setback, none of the new columns in the overbuild would align with those in the existing structure below. In response, we designed a reinforced concrete structural transfer slab to redistribute loads from the new floors to the existing columns in the original structure below.

Weight Reduction Through Innovative, Sustainable Materials

Standard residential structures utilize flat concrete slabs some 200mm thick. But since the One Wall Street conversion was anything but standard, that approach would add excessive weight beyond the existing structure's capacity. Instead, DeSimone opted for the innovative use of voided concrete slabs (in this case, a Cobiax product) using a high-strength, lightweight concrete mix.

Essentially, each concrete slab is embedded with a series of hollow, recycled plastic, ellipsoid void formers, which effectively reduce the weight while preserving the existing structure's integrity. By combining the lightweight mix design and the voids, the overall weight of the concrete slab was reduced by 40%. Better yet, less concrete means less embodied carbon and a more sustainable building solution.

The overall reduction in weight in the overbuild, in turn, reduced the thickness required for the transfer slab, mitigating the need for more extensive column reinforcement — thanks to adding less overall mass to the top of the building.

The resulting structure is a lighter and more flexible structure that meets the performance requirements for wind and seismic forces.

Lower-Level Structure — and New Retail Space

Key to a luxury urban residential high-rise is convenience and the inclusion of luxe retail. To create the long span spaces needed for high-profile, high-end retailers like Whole Foods, Life Time Fitness and the renowned French department store, Printemps, we created a glass retail addition elegantly cantilevered off the annex building, which also enabled us to avoid drilling into the Wall Street subway station directly below. We removed the entire second floor support structure of the south tower, along with sections of the third floor, redistributing the floor area.

This created a significant interruption in the supporting steel frame, which now needed reinforcement. Installing a large steel plate truss at the underside of the new third floor did the trick. This truss connected to three new concrete shear walls, which were added to redistribute the loads and increase stiffening at the base of the tower.

The shear walls were designed to resist the loads delivered from the steel plan truss. These walls also provided a much-needed stiffening mechanism, ensuring that the newly added weight and height did not compromise the building's stability. The decision to use concrete encasement for existing steel elements was also a strategic one. Encasing the steel beams and columns in concrete allowed for greater stiffness and load-bearing capacity, while simplifying construction in areas obstructed by lead paint, rivets or other older construction materials.

A Dense, Urban, Historic Site

The very features of the Wall Street neighborhood that lent it its charm — the crooked, winding streets and landmarked architectural gems, including Trinity Church across the street — added yet more complexity to realizing this intricate conversion. The existence of the Wall Street subway station, just under the sidewalk on Broadway, made structural reinforcement and construction especially fraught, with heightened security measures at the nearby Stock Exchange further complicating site access and logistics.

Where, for example, could a crane be placed? Installing a conventional crane for the overbuild at such a dense site would be nearly impossible. Choosing to use cast-in-place

concrete meant the concrete could be poured with a pump. Formwork and reinforcing bars could be brought up the hoist. A crane was no longer necessary.

Making Luxury Interiors Possible

Only the spectacular former banking room, known as the Red Room, designated an interior landmark in 2024 for its striking, floor-to-ceiling terrazzo murals in deep reds and golds, was left completely intact, though restored. Otherwise, the vast interior of One Wall Street experienced a massive restructuring and reimagining to adapt it for not only residential living, but to meet the elevated standards of luxury lifestyle living.

First, we modified the structure to bring as much light as possible into the deepest areas of this full-block residence. Then we carved out new windows and masonry openings, and converted rooftops into amenity terraces. We punched new openings through existing office floor slabs and severed or removed beams throughout the interior to direct plumbing and utilities to each private living space. We even removed 34 elevators (20 of which had served the upper floors, many of which hugged the perimeter, blocking light to the interior) and 16 escalators. We relocated others, resized shafts, introduced 10 new elevators into the building core and created new staircases, all of which required creative engineering on a mind-boggling scale.

To accommodate the depth of a spectacular pool to crown the new addition, we created a long-span, steel structure for a wide-open, column-free space at the floor below.

Technical Ingenuity in Service to Adaptive Reuse and Luxury Living

One Wall Street exemplifies the complexity and innovation required to undertake large-scale conversions in historic urban environments. The engineering solutions — ranging from lightweight slab design to complex structural reinforcement and logistical coordination — demonstrate not only the need for creative approaches to engineering, but a keen understanding of architectural heritage and modern building performance requirements. Through a combination of innovative materials and adaptive engineering strategies, the project team successfully transformed a revered but hobbled office building into a model for luxury urban living.