

ONE YORK

Steel Bests a Bevy of Challenges

In planning and constructing the Tribeca condo project One York for developer Stanley Perelman, TEN Arquitectos didn't deliberately seek out all the possible challenges they could find—they just found them. In fact, at any one of several stages in the project, Norten's design could have been deemed unbuildable. Instead, thanks in large part to the properties of structural steel, TEN made the most of an extraordinarily difficult site and in the process added a rare gem to lower Manhattan.

Only some of the project's challenges were inherent in the site; others were self-inflicted. The site boasted two 1845-vintage six-story brick warehouses, which zoning required be converted rather than demolished. While the structures had no telltale cracks, a century of vibrations from the nearby A/C/E subways left one of the buildings with an eastward tilt some six inches out of plumb. Adding to the challenge, the soil conditions offered little in the way of suitable bearing to help remedy the situation: Schist in this part of Manhattan is buried deep, and the warehouses bore on sand. So when the MTA changed its influence-line regulation from a 1:1 to a 1:2 ratio, meaning the original 45-degree angle requirement for

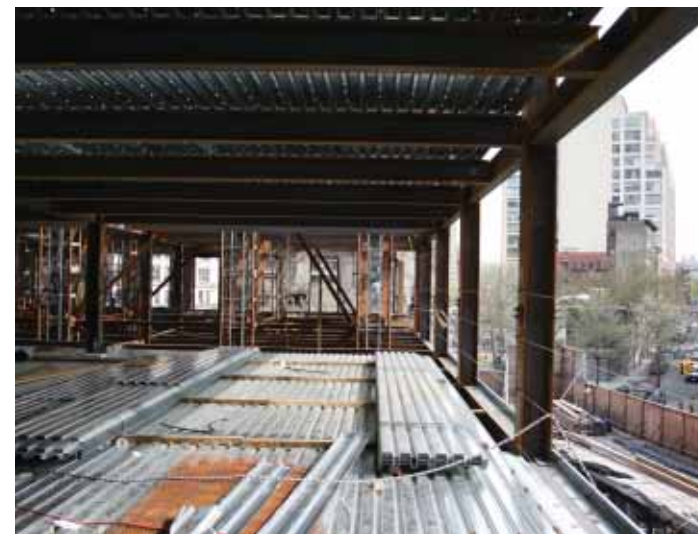
establishing foundation interference with a nearby MTA subway tunnel became a more rigorous 30 degrees, the whole building and one party wall required extensive underpinning. To meet these requirements, the team had to remove all but two walls of the existing buildings, and some necessary temporary wall bracing had to be internal to avoid resting atop the MTA's tunnels. Coupled with the fact that close neighbors included Con Edison and Verizon buildings—the latter harboring most of downtown's fiberglass telecom cables—excavation at this site was only somewhat less complicated than brain surgery.

The program was almost as complex: a residential component, a retail segment, a Chinese-American community center, and an automated parking garage. This last feature was a high priority for the developer, who sought residents from the upscale end of Manhattan's housing market, largely car owners who'd view the location near the Holland Tunnel not as a noisy nuisance but as a means for quick escapes from the city. (Design plans for One York began four years ago, before the market began paying much attention to LEED points and non-auto-centered neighborhood plans, notes project architect Florian

Facing One York's steel superstructure allowed seven additional floors of residential space to be added to the site, whereas a concrete system would have only allowed two.



© dbox



Oberhuber, an associate at TEN.) To balance and separate all these functions, TEN designed a multifaceted three-entrance building that places a 14-story translucent crystal box between the two brick warehouses, and astride a new corrugated-metal garage, much like a polished stone in an unpretentious setting. Achieving Norten's ambitious aesthetics—connecting folding planes of the new glass curtain wall to the brick masonry to produce an ethereal profile without sacrificing stability or relying on wedding-cake setbacks—called for creative engineering, particularly where loads are transferred at the seventh floor.

Steel offered distinct advantages over concrete for the building's structural system. Although the majority of residential buildings in New York use reinforced concrete, says senior project engineer Peyrouz Modarres of DeSimone Consulting Engineers, One York's unique features made steel the logical choice on multiple grounds: weight, flexibility, speed of erection, ease of reinforcement, and economics. Projects like this one, where planning and approvals create a long lead time and fabrication time isn't as important as rapid construction, create a strong case for overcoming what Modarres calls "this false attitude

that for residential construction, steel is not suitable." The steel framework was able to adhere to and respect the cast-iron grid within the reconstructed original building; in the new segment, it allowed several daring choices that a heavier concrete frame couldn't, including seven new stories' worth of high-end amenities and wraparound views. (An early concrete scheme, says Oberhuber, could only have held two.)

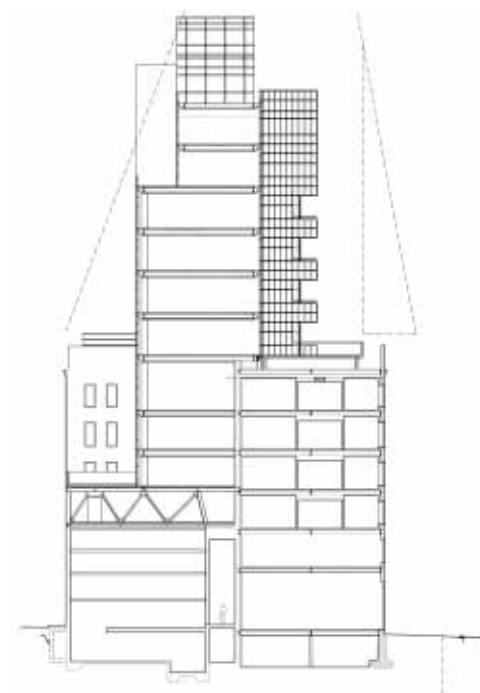
Norten's desire to give the glass volume a light, translucent feel and uniform mullion spacing (in a somewhat unusual 5-foot-10-inch grid) called for some out-of-the-ordinary structural choices. The job used a large number of relatively light members, chiefly 12-inch wide flange beams of ASTM A992 Grade 50, ranging from W12x14 through W12x30; the project used a total of 876 tons of steel, according to Ronald Keating of Metropolitan Steel Industries. Emphasizing the contrast between the glass and masonry volumes, Oberhuber says, meant that in the apartments, "we wanted the curtain wall to have many horizontals and a pretty wide span between the vertical members and lose the sense of slabs. From the outside, it's hard to tell where the slabs actually are." Concrete flooring here is a slim 4¾ inches thick;

Above, clockwise from top left
The existing warehouse's cast iron structure; the preserved walls and new foundation work; One York gets its skin; the new steel structure with metal decking.

Facing, clockwise from top left
The new steel structure begins to rise behind the existing walls; one crawler crane lifted all the members into place; triangulated elements of the framing form balconies; the long spans provided by the steel system.

Drawings East west and north south sections.

© TEN Architects





© Lenard Smith

the curtain wall is connected directly to cantilevered steel plates with welded inserts; heating ducts are raised above the floors, admitting light both above and below. Columns are set back from the perimeter about 4 feet along the west wall and 1½ feet along the east; column sizes include W12x58, W12x72, W12x96, and W12x120, plus W14x257 columns in the elevator core. The off-center nature of the core abutting the western wall on St. John Lane creates special stiffening requirements to control lateral forces; a change midway through construction widened the core and encased it in concrete shear walls. On the seventh and 11th floors, apartments with dramatic double-height living rooms include HSS 12x8x¾-inch ring beams attached to the slim curtain wall, anchored sideways to the columns, and, to minimize bulk, fireproofed with A/D Firefilm III intumescent paint with a 2-hour rating.

After the design was complete, one prominent multi-floor buyer whose property included the seventh-floor terraces opted for a private pool, hot tub, and ample foliage, including two full-grown Austrian pine trees, whose root structure requires special interior space. The redundancy of the structural system allowed DeSimone to accommodate these and other changes throughout the project. “That’s the other beauty of steel,” says Modarres, “that it’s easily reinforced by adding plates. Not necessarily cheap, but if you had a concrete slab, it’s not easy to reinforce it.” Another area requiring a mid-course correction was the third-floor community center, where increasing loads called for beam sizes requiring floor-to-floor heights that the owner rejected. The solution was to abandon the conventional transfer beam entirely and arrange W12x19 to W12x65 beams to create floor-high V-shaped trusses large enough to walk through.

Owing to the garage, the building handles dynamic as well as static loads. The garage system, an Italian design manufactured in China, moves cars via turntable to an automated dolly that files them into cubbyholes at any of four levels (three above-ground floors and one underground). A digital key-card system controls retrieval: Owners can enter a code before leaving an apartment and have their car ready when they reach the garage. Though common overseas, this is only the second such system in New York and the only way One York’s tight site could accommodate garaging. The cars’ weight is less of a problem, says Oberhuber, than vibration. Consequently, the garage has its own largely freestanding structure with two transfer beams braced back to the building’s main framework.

DeSimone’s structural work for One York earned a 2008 platinum Engineering Excellence Award from the American Council of Engineering Companies of New York. The building has become a flagship project for TEN’s New York office and may become a local landmark as well, defining what Oberhuber calls “the end of Tribeca,” the northernmost border of this sophisticated neighborhood. As a boutique building, One York can offer its comforts and vistas to only a few dozen residents, but its effect on local building practices may be far-reaching: It sets a strong precedent for extending the benefits of steel construction to New York’s residential stock. With the city’s housing needs drawing architects’ and developers’ attention to previously unexplored sites, steel’s versatility offers surprising answers to the questions that new urban spaces can raise. ■



Facing page and above Insulation values provided by the masonry elements of the existing warehouses allowed One York’s glass volume to be as transparent as possible.

ONE YORK STREET

Location: **1 York Street, New York, NY**
Owner: **One York Property, LLC**, *New York, NY*
Developer: **Jani Real Estate**, *New York, NY*
Architect: **Enrique Norten/TEN Arquitectos**, *New York, NY*
Structural Engineer: **De Simone Consulting Engineers**, *New York, NY*
Mechanical Engineer: **ADS Engineers**, *New York, NY*
General Contractor: **Bovis Lend Lease**, *New York, NY*
Curtain Wall Consultant: **Israel Berger and Associates**, *New York, NY*
Structural Steel Fabricators: **Metropolitan Steel Industries**, *Sinking Spring, PA*
Structural Steel Erectors: **Midlantic Erectors, Inc (Steelco)**, *Roselle, NJ*
Architectural Metal Erector: **Burgess Steel**, *Englewood, NJ*
Ornamental Metal Erector: **Summit Group Inc.**, *East Rutherford, NJ*
Curtain Wall Fabricator: **Ferguson Neudorf Glass**, *Beamsville, ON, Canada*
Curtain Wall Erector: **Enterprise Architectural Sales, Inc.**, *New York, NY*
Executive Architect: **Richard Bienenfeld Architect, PC**, *New Rochelle, NY*