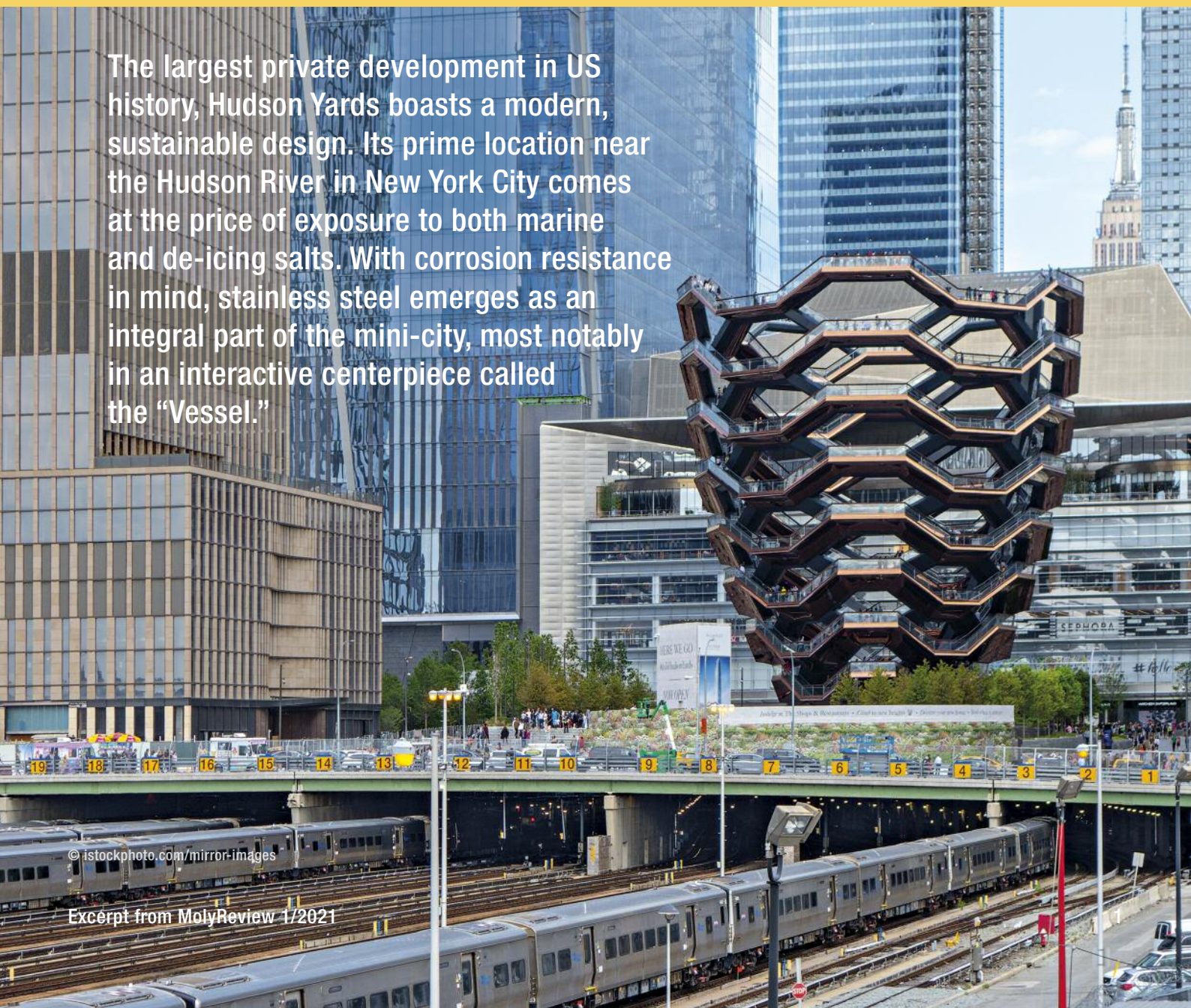




Hudson Yards: from railyard to riches

The largest private development in US history, Hudson Yards boasts a modern, sustainable design. Its prime location near the Hudson River in New York City comes at the price of exposure to both marine and de-icing salts. With corrosion resistance in mind, stainless steel emerges as an integral part of the mini-city, most notably in an interactive centerpiece called the “Vessel.”

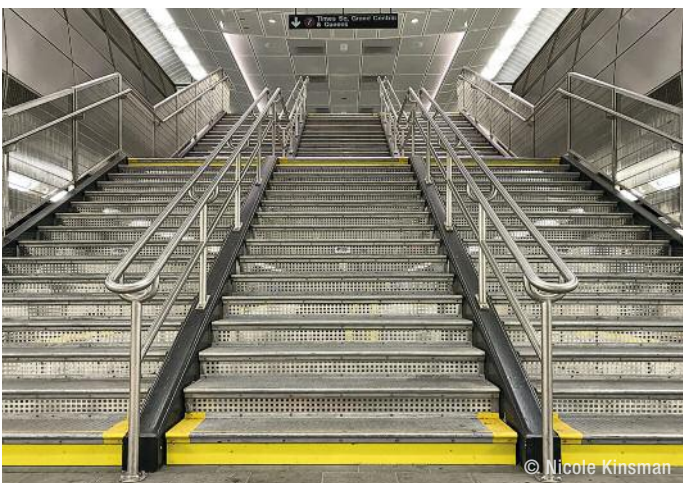


Since its initial groundbreaking in 2012, Hudson Yards has transformed a busy railyard into a chic, multi-functional space. The \$25 billion development will have 2.5 million square meters of commercial, entertainment, educational and residential space upon completion, with over 56,000 square meters of public space and greenery. Some of the buildings and structures in the project boast glimmering surfaces and a clean geometric design. Multiple elements make significant use of Type 316L or 2205 stainless steels. The 2% molybdenum content in Type 316L stainless steel provides heightened corrosion resistance. With 2205 duplex stainless steel, the molybdenum-content rises to 3%, providing even greater resistance to atmospheric corrosion. New York is coastal and uses significant amounts of deicing salts, hence the need for increased protection against aggressive chlorides. The new neighborhood has particularly high deicing salt exposure because the primary wind direction in winter blows deicing salts off the adjoining Henry Hudson Parkway towards the site. The first phase of Hudson Yards, including the Vessel sculpture first opened to the public in 2019.

Building up

To maximize available space in densely developed mid-town Manhattan, part of Hudson Yards spans over an active railyard. Building over the large space with moving trains posed a formidable engineering challenge. To meet this challenge, construction teams built a series of platforms across the yard by driving caissons in between the tracks. Each platform staged the equipment for the construction of the next. In total, 300 caissons were used, allowing trains to run safely under what is now a busy neighborhood. Within the platform itself, storm water from the development is collected and pumped through a layer in the concrete to

➤ The 34th Street-Hudson Yards subway station features stainless steel in many forms. From the treads and handrails of the main stairs to architectural features like the cladding of the tunnel on the right, Type 316L stainless steel is omnipresent.



cool it and to irrigate the plant life on the surface. This system keeps the vegetation safe as the heat of the trains running below can reach over 65 degrees Celsius.

Offering all the amenities of a full-sized metropolis, Phase 1 of Hudson Yards is also sustainable, having been awarded a Gold level U.S. Green Building Council (USGBC) LEED Neighborhood Development status. It is the first neighborhood in Manhattan to attain that prestigious certification and all buildings have been rated either LEED Platinum or Gold. When completed in 2025, the development will consist of more than a dozen skyscrapers, a cultural venue, a free school, both conventional and affordable housing, and more than 100 shops and restaurants. It sits at the northern end of the recently completed High Line park, near Hudson River Park, and will include 5.7 hectares of public greenspace. These three new public spaces are the largest increase in parkland in New York City since the creation of Central Park.

A city of stainless steel

The somewhat isolated location of the Javitz Center, New York City's main convention center that adjoins Hudson Yards, inspired the extension of a subway line on the west side of Manhattan. The new 34th Street-Hudson Yards station of the 7 Train is now one of New York's largest, and stainless steel is abundant in its design. The station's impressive glass and structural stainless steel entrance canopy, bollards, turnstiles, handrails, escalator railings and interior lower wall cladding are all made of Type 316L stainless steel. This material was chosen for its aesthetics, for its low maintenance and for its ability to meet the project's 100-year design life requirements.



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➤ Soaring 100 stories above West Manhattan, the bottom of the Edge is clad in Type 316L stainless steel and features a thrilling glass floor.

➤ Massive stainless steel panels clad part of the base of 15 Hudson Yards.

Hudson Yards' first completed tower was 10 Hudson Yards, which was designed by Kohn Pederson Fox (KPF). The tower straddles the High Line and features a soaring atrium and floor-to-ceiling glass in a column-free space. The curtain wall is aluminum with Type 316L stainless steel accent panels. Also designed by KPF, 30 Hudson Yards is both the tallest tower in the development and the fourth-tallest in New York. The façade features the same glass shingles in a saw-tooth pattern that were used on 10 Hudson Yards. 30 Hudson Yards is home to the "Edge", now the second-highest outdoor observation deck in the Western Hemisphere after Toronto's CN Tower. Rising 335 meters above the city, the Edge is clad in Type 316L stainless steel panels with a bright linen finish. From the ground, the triangular deck juts smartly from the side of the tower, which also features Type 316L stainless steel accent panels. Visitors who ascend this observation deck can look through a glass floor to the tiny urban world below. There are even yoga classes on the deck, offering panoramic views of Manhattan on three sides.

Located between the two towers, 20 Hudson Yards is designed by Elkus Manfredi Architects and KPF. The east façade is clad in perforated Type 316L stainless steel panels, which feature a unique pleated design that transitions to flat perforated panels. The 20 Hudson Yards façade facing the Vessel features the West Podium Art Wall, curved glass, designed by artist James Carpenter, on a cable wall system, engineered by sbp. It is one of the world's first cable net walls supporting individually curved glass panels and most of its structure is made from stainless steel.

Across from the Vessel, yet another stainless steel element punctuates the sightline. Where the base of 15 Hudson Yards meets the Shed, a distinctive new performing arts center, Type 316L plate cladding forms a border façade merging the two elements. This massive façade wraps around the back of 15 Hudson Yards like a ribbon. Type 316L stainless steel was used also in the structural frames of the benches throughout the development. With so many applications, stainless steel contributes greatly to a sense of rhythm among the forms at Hudson Yards.

➤ The Art Wall's design supports stiff glass panels on a flexible horizontal and vertical cable net substructure.



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Reflections of New York

Thomas Heatherwick designed Hudson Yards' centerpiece, the Vessel, with the idea to bring people together. Staircases are natural places of meeting and interaction, and so the sculpture draws inspiration from both the famous Spanish Steps in Rome and the intricate stair construction of ancient Indian stepwells. The design team was also inspired by the inward and outward-facing aspects of ancient amphitheaters, which is evident in the side openings and oscillating trajectory of the Vessel's stairways.

The 16-story lattice of the sculpture has 2,456 steps in 154 flights of stairs connected by 80 landings. Together this creates more than 1.6 kilometers of possible interconnecting routes that create opportunities for human interaction. While there is an intriguing inner facing focus, the outward-facing voids in the stair and platform lattice provide kaleidoscopic views of the Manhattan landscape to visitors walking the unique, beehive-like structure.

The railing posts that line the Vessel's interconnecting walkways are 2205 duplex stainless steel. These railings provide both safety and subtle lighting for evening visitors.

The high strength of this alloy made the slender hollow posts possible, but the alloy was also selected because stairways have a much higher level of deicing salt exposure than other sections. Guests with limited mobility headed for the top of the sculpture also benefit from stainless steel in an incredible elevator only made possible with amusement park ride technology. Many of its functional and decorative elements are stainless steel.

In contrast with the sharper, geometric architecture of the surrounding buildings, the Vessel boasts a softer, more rounded design, giving the illusion of movement. The mirror-polished Type 316L stainless steel panels that wrap around the floating staircases have a customized multi-layer PVD finish, bringing the rich red-bronze look of traditional sculpture to this contemporary project.

Altogether, the abundance of stainless steel in both the sculpture and throughout Hudson Yards reinforces the materials' durable performance against the challenges of the city's environment. Neither salts from the ocean and de-iced roads, nor tens of thousands of visitors will dull the project's shine. With only half of Hudson Yards completed and open to the public, the story is just beginning. (Grace Cooper, Catherine Houska, Karlee Williston)

➤ The reflective red-bronze colored stainless steel panels create a kaleidoscopic effect on the Vessel.

