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## Hudson Yards designed to fend Off natural and man-made disasters

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New York developer Related Cos. is set on Friday to open what will be the largest private development in the U.S. The \$25 billion project on Manhattan's west side features office towers, thousands of apartments, a giant mall and green spaces designed to attract people with light and airy architecture.

But behind the scenes, this city-within-a-city is designed like a fortress.

The developers incorporated lessons from recent storms, terrorist attacks and freakish occurrences in New York and around the globe. Hudson Yards' gatekeepers have devised a plan to keep out the bad elements, whether criminals or acts of nature.

The protections include a power system that can survive a citywide blackout, a rainwater collection system, and a visible police presence with guard dogs.

These measures have been big selling points for Related in marketing what used to be a windswept rail yards to big office tenants, luxury stores and people able to spend millions of dollars on apartments. Demand for high-price real estate increasingly is coming from millennials and other consumers who have become more concerned about security, resilience and sustainability than their parents.

Heat exchangers, engine and control panel of the 13.3 megawatt electricity plant located in Hudson Yards to assure power even during disasters. PHOTOS: EMIL LENDOF/THE WALL STREET JOURNAL

Raymond Kelly, a former New York City police commissioner who toured Hudson Yards while it was under construction, said that designing security for a high-profile development is a balancing act between making the facility inviting and keeping it safe.

"You can't make it an armed camp," he said. "There's a tipping point. A lot of security gives people the message that there is a threat there."

The devastation from 2012's superstorm Sandy's floodwaters helped convince Related and its partner, Oxford Properties Group, to move some mechanical systems higher in buildings and install giant airtight "submarine doors" underground that can be closed to protect against storm surges.

"If we see something like another Sandy rolling up the coast, we could start taking those preparatory steps," said Frank Norcross, a Related vice president.

Hudson Yards also has its own power plant that will keep the lights on and computers humming even if New York's power grid goes down. During the Japan earthquake and tsunami of 2011, the Roppongi Hills development had a similar plant and became a "refuge" for the elderly, children and others who desperately needed power, said Marianne Kwok, an architect at Kohn Pedersen Fox who worked on Hudson Yards.

Security at Hudson Yards also was highly influenced by the Sept. 11 terrorist attack that destroyed the World Trade Center. The developers worked with consultants like British security firm G4S Secure Solutions and former New York City Police Department Commissioner William Bratton to plan for contingencies ranging from truck bombs to active shooters to chemical attacks.

Other Hudson Yards features were designed to "future-proof" the complex from new environmental demands and technological changes. A rainwater collection system will be able to recirculate more than 8 million gallons a year while a planned garbage processing plant will use grinders and dehydrators to reduce food waste by 20%.

The building's fiber backbone for electricity and internet was designed to stay running even if connections to the street go dark.

"We did our best to bridge the gap between the rapidity with which technology evolves and the static nature of the built environment," said Luke Falk a Related vice president.

Some of Hudson Yards' big office tenants welcome environmentally friendly building features.

Asset manager BlackRock Inc., which is moving its headquarters to 50 Hudson Yards, is "increasingly integrating" issues of the environment into its investment process, Larry Fink, the firm's chief executive, said in a letter to investors last year. A company's ability to do this "demonstrates the leadership...that is so essential to sustainable growth," it said.

Dealing with concerns about terrorism is nothing new for New York developers. There were epic battles during the rebuilding of the World Trade Center between Mr. Kelly, who was the police commissioner then, and developers over such issues as how close One World Trade Center would be to the road.

"We ultimately won. But it wasn't easy," said Mr. Kelly, who today is head of Guardian Group, a security consulting firm.

Hudson Yards also faced an additional security challenge from the fact that most of it is built on a platform above rail yards. Related executives declined to comment on how they keep intruders out of the underground area, but they point out that similar challenges have been overcome in other parts of New York that are built over tracks, like north of Grand Central Terminal along Park Avenue.

Structurally, Hudson Yards buildings are as sound as any built on solid ground because their structures extend through the platforms to the bedrock below, said Eli Gottlieb, managing partner of Thornton Tomasetti, the engineer on the project.

"The whole project in the end is founded on rock," he said. "We drilled caissons to rock everywhere."