

Chapter 2

BUILDING CONSTRUCTION, CODES, AND STANDARDS

2.1 HISTORY OF THE BUILDING

WTC 7 was a 47 story commercial office building located immediately to the north of the main WTC complex. It occupied the block bounded by Vesey Street on the south, Barclay Street on the north, Washington Street on the west, and West Broadway on the east. Located approximately 350 ft (105 m) from the north side of WTC 1, it was connected to the WTC complex by a 120 ft wide elevated plaza and a 22 ft wide pedestrian bridge at the 3rd floor level. Its location relative to the WTC Plaza is shown in Figure 2–1. Completed in 1987, WTC 7 contained approximately 2 million ft² of floor area.

WTC 7 was trapezoidal in plan with dimensions of approximately 329 ft on the longer side, 247 ft on the shorter side, 140 ft wide, and 610 ft high. The building was constructed over a pre-existing electrical substation owned by Consolidated Edison (Con Edison). The original plans for the Con Edison substation included a high-rise building, and the foundation was sized for the planned structure. However, the final design for WTC 7 had a larger footprint than originally envisioned and accommodations were made in the foundation, as described in Section 2.4.1. Over the years, numerous structural modifications were made throughout the building, mainly to suit its largest tenant, Salomon Brothers Inc., later to become Salomon Smith Barney and now Citigroup. One of the more substantial modifications was the addition of a penthouse, referred to as the east penthouse, which was used to house a chiller plant and cooling towers for Salomon Brothers. Also, large portions of Floors 41 and 43 were removed on the east side of the building to accommodate trading floors for Salomon Brothers. The removed floor areas were subsequently restored after the trading activity was moved to another venue.

Above Floor 7, the building had typical steel framing for high-rise construction. The floor systems had composite construction with steel beams supporting normal weight concrete slabs on metal deck, with a floor thickness of 5.5 in. The core and exterior columns supported the floor system and carried their loads to the foundation. The exterior moment frame also resisted wind forces. Many of the columns above Floor 7 did not align with the foundation columns, so braced frames, transfer trusses, and transfer girders were used to transfer loads between these column systems, primarily between Floors 5 and 7. Floors 5 and 7 had heavily reinforced concrete slabs on metal deck, with thicknesses of 14 in. and 8 in., respectively. A complete description of the structure is given in Section 2.4.

The architectural design was performed by Emory Roth & Sons, P.C. The structural engineer of record was the Office of Irwin G. Cantor, and the mechanical engineer was Syska & Hennessy, P.C. Tishman Construction Corporation was the general contractor.