Final Report
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Executive Summary

The Weill Cornell Medical Research Building is a 19 story, 455,000 square foot, 294'-6" tall building located on East 69th Street in New York City. The building features three stories below grade and eighteen, plus a penthouse and an interstitial floor, above grade.

The purpose of this thesis was to design a pre-stressed concrete alternative to the existing reinforced concrete two-way flat plate floor slab. Two such systems were investigated. A banded beam system and a two-way post-tensioned flat plate slab were designed. It was determined that the two-way PT slab would be the better of the two alternatives. The criteria for the viability of these alternatives was the elimination of the need to camber the concrete slab for the front cantilever while still meeting deflection requirements and limiting floor-to-floor heights. This was accomplished. The slab was decreased in thickness from 12 ½ inches to 10 inches. This has the added benefit of allowing more flexibility for MEP equipment and reducing the amount of concrete needed for the structure.

Following that, investigations were made into the possibility of altering the size of the massive 14 x 72 columns from which the cantilever extends, and into the removal of the columns in Row B. It was determined that the 14 x 72 columns are necessarily large and surprisingly well utilized. The investigation into the removal of the Row B columns showed that deflections would be much too severe and the idea was deemed not possible.

Finally, mechanical and architectural studies were conducted on the enclosure system resulting in a redesign of the system from a brick cavity wall to an EIFS wall system. The goals of the design of the new exterior wall system were to reduce the chance of condensation in the air space (a danger posed by the existing system), reduce the amount of heat loss and gain of the wall, and to create a thinner and lighter system. The new EIFS system performs better in preventing condensation and reducing heat transfer through the wall and was also deemed to be architecturally more versatile and more becoming of the Weill Cornell Medical Research Building.