

# EXECUTIVE SUMMARY

The New York Police Academy is a building that consolidates the New York City Police recruit training into one facility. This building is located in College Point, New York and is 536' long, 95' wide and 150' high. The building has a gravity system consisting of lightweight concrete on metal deck. In the East/West direction, the "X-Direction," the building has moment connections and one double bay of HSS cross bracing to resist lateral loads. In the North/South direction, the "Y-Direction," the lateral resisting system consists of HSS cross bracing in two of the three bays.

This report focuses on showing the changes that occur when altering the lateral resisting systems of the New York Police Academy. The thesis redesign removed the 468 moment connections from the original design and added 128 concentrically braced connections to resist lateral load in the X-direction. This connection was used strictly for constructability purposes. The thesis redesign also removed the 168 concentrically braced HSS connections and replaced them with 136 chevron braced W-shape connections. The chevron system was chosen because the bay sizes were rather large. The W-shapes were chosen because they are cheaper to fabricate than HSS shapes. HSS shapes are typically chosen for their aesthetic appeal. However, in this project, those frames are hidden within the walls. Because HSS shapes are aesthetically pleasing the double bay of HSS bracing in the X-direction remained intact during the redesign. These connections were designed using the controlling lateral loads for the New York Police Academy.

The concentrically braced frames in the X-direction greatly influenced the architecture. The moment frames allowed for a glazed curtainwall façade, which was altered in order to compensate for the concentrically braced frames. Rather than hide the braces, the structure was accentuated with the intention of integrating and embracing the system within the façade.

The construction studies of cost and scheduling provide optimal results. The original lateral system costs \$1,606,325.97. The thesis lateral system in conjunction with the changes made to the façade of the New York Police Academy would cost \$827,408.92, a savings of more than 48%. The redesign would also limit the number of man hours needed to assemble the lateral system from 4,116 man hours in the original design to 1,320 man hours. This accounts for approximately 68% savings in time, allowing the building to be constructed faster.

In sum, the thesis redesign would save both time and money without sacrificing the building aesthetics.