

## **EXECUTIVE SUMMARY**

Lockwood Place in Baltimore, Maryland is a thirteen story mixed-use development building utilized predominately for retail and corporate businesses. The existing building enclosure is made primarily of steel with a glass curtain wall façade. Directly adjacent to the building abuts a covered mall area and a parking garage. The parking garage connects to the second level of Lockwood Place through a corridor and lobby.

The goal of this report is to redesign and evaluate Lockwood Place as a post-tensioned concrete building and determine the viability of this solution. The effectiveness of the redesign is based on increased plenum depth for MEP systems, an increase in air duct size creating a quieter, energy efficient system, and reduction in cost and schedule for the building. These criteria were determined through a complete redesign of the building's structural system, resizing of mechanical air ducts and fan, and a cost and schedule analysis for both existing and proposed systems.

The building's structural steel system was completely replaced with concrete. The proposed floor was a 12" two-way post-tensioned floor. Moment frames and eccentric braces were replaced with five shear walls. Caisson sizes increased due to additional building weight. An increased depth of 18.25" plenum space was gained.

Mechanical air ducts were enlarged to utilize additional plenum space. With enlarged duct sizes, static pressure supply required by the fan decreased. A new typical fan was sized to supply 11.2horsepower, which is less than the 20horsepower required by the existing fan. The new fan also proves to provide more space in the mechanical room and lower installation costs due to the smaller size and reduction in weight of the fan unit itself.

Cost of the structural system was determined for each existing and proposed systems. The change from steel to concrete resulted in a 16% decrease in cost. A schedule was also determined for the existing and proposed systems. The proposed system resulted in an additional five weeks of construction time. This was expected due to the time required to form, pour, and cure concrete. Despite the additional construction time required, the proposed system was determined to be a viable solution to Lockwood's Place structural system.