EXECUTIVE TOWER
NW WASHINGTON, DC

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STRUCTURAL

EXECUTIVE SUMMARY

The Executive Tower is one of the highest rental rates in the Washington DC area at $47 per sqft-month. At this rate, constructing buildings with a maximum floor space is ideal. However, in the case of the Executive Tower, and most buildings the DC area, it has a height restriction of 130' measured from the north edge of the building to the ceiling of the 11th floor with an 18' penthouse space above not included in the height. Concrete systems are typically used in DC in order to achieve thinner ceiling spaces and get a maximum number of floors over a plot of land. The same concept was used in this report where an architectural study, mechanical study, and post tension design were used with similar goals of ultimately lowering the building height enough to construct a 12th floor typical to floors three through nine.

The architectural breadth developed a new design for the entrance into Retail 2. The building height is measure at the north corner. If the north corner were even with the south end, the Executive Tower has the potential of being constructed 5' – 6" lower. This entrance was designed to be recessed into the ground by 3' – 0" after drawing a few sketches and comparing their advantages and disadvantages.

The mechanical breadth study rerouted a new duct system to optimizing the air flow through each duct. By doing this air was more evenly distributed through the system so the duct sizes were able to be sized to thinner sections. The controlling duct size in the existing system was 12 inches. After the rerouting and excel calculations, this number was able to be reduced to nine inches, saving three inches per floor.

The depth study of this report was converting the Executive Tower's floor system from a reinforced flat slab to a post tension slab to reduce the thickness up to three inches, from eight inches to five inches. A model was constructed using RAM Concept to calculate the various arrangements of the columns in the Executive Tower through a finite analysis. The results were conclusive that a post tensioned slab was necessary to decrease the slab, however, through the analysis it was only able to be reduced by two inches. The five inch slab was failing in both flexure and deflection in most of the long spans of the floor system.

As a result of the new systems, the Executive Tower building height was able to be reduced by 9' – 3". The necessary reduction needed to be at least 11' – 0". The Executive Tower is only 1' – 10" over the 130' with the addition of the 12th floor, however this is still capable of being reduced under this limit by lowering the ceiling height per floor by only two inches, from 9' ceilings to 8' – 10" ceilings.