



## Summary and Conclusions

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Taking all design considerations into account, this re-design of the spatial layout of the columns opened up the opportunity for the use of alternative floor systems. After considering several different alternative floor systems, a pre-cast concrete hollowcore plank system was chosen. This system was chosen for its exemplary load carrying capacity over longer spans, quick constructability, quality and custom forming, and the shallow depth of the system. The floor system was designed to the same depth as the current floor system so there will be no impact on the overall building height. This means there will not be the need to do any kind of further analysis done on the lateral building system. Once the columns were re-located, the floor system was then designed using the new bay sizes and spans. The columns were then re-designed to carry the new loads from the planks. After designing the columns for the new loads, it was shown that the new layout led to a lesser amount of load distributed to the columns allowing for smaller columns which opened up more architectural space. Even though more columns were required within the floor plan to create the grid pattern that was being designed, the smaller sizes per column make up for the loss of architectural space throughout the other areas of the building. The breadth analysis for the mechanical system showed that the new column layout coupled with the pre-cast concrete plank floor system will not have a detrimental effect on the design layout for the ductwork. In addition to the pre-cast system having the same depth as the existing flat plate slab system, other means of determining the value of using an alternative system were needed. This was carried out in the form of the construction management breadth analysis. Through this analysis, it was discovered that the newly designed pre-cast plank system would prove to be quicker to install, allow for faster finishing work, and provide easier placement for supplementary systems such as conduit and mechanical ductwork hangers. From the comparisons made throughout this report, it is apparent that all the changes made to the structural design of the building would only allow for faster construction and better constructability conditions. It has been shown that the systems chosen to be altered were designed in such a way as to only benefit the design and construction of the building.

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