

Executive Summary

The intent of the report is to investigate the proposal presented for the Edward L Kelly Leadership Center. The proposal includes an investigation into a re-designed structural system, a study into the possibility of architectural changes to the building, and the construction process impacts that arise from the changes.

The initial structural system of the building consists of non-composite steel beam and open web steel joists with non-composite steel deck and concrete floor slab. The proposal investigated the possibility of altering the gravity system to replace the open web steel joists with composite steel beams and composite steel deck and concrete floor slab. Also, multiple lateral system changes were examined which included braced steel frames, concrete or masonry shear walls, and the existing moment frame system. Wind and seismic forces were analyzed due to the architectural changes to the building. Foundation impacts were also looked at to test their adequacy. The goal of the new system was to increase the economy of the structural system. The composite system was found to decrease the floor system depth as well as the weight of the building and ultimately was most economical. The lateral system was, in the end, kept as the original moment frame system in the existing building. However, the number of frames was reduced from eleven to six in the north-south direction and from three frames to one frame in the east-west direction. The foundation of the building was increased slightly to accommodate the new architecture

For an architectural study, the proposal was to investigate the need to add additional stories to a portion of the building as a purely academic study. Two floors were added to one of the wings of the building adding an additional 36,000+ square feet for future expansion. In addition, the changes to the architecture of this wing also impacted the architectural experience in another part of the building. These impacts were studied and a solution was proposed to incorporate a green roof over a portion of the building. The new system provides potentially needed extra square footage for future expansion as well as an improved aesthetic appeal to the building.

For a construction management study, the cost and scheduling issues that resulted from the structural and architectural changes were analyzed. A takeoff of the changes that resulted from the new systems was compared to the existing system. The cost of the system new system was found to be \$1.32 million compared to the original system which cost \$0.779 million which is logical due to the additional two stories added. However, when analyzed as a per square foot or per floor basis, the construction cost is approximately the same cost at \$260,554 per floor for the existing building and \$236,063 per floor for the re-designed building. The new system provided a faster schedule as well as a cost savings. The green roof added an additional cost of \$660,000-\$750,000 to the building.

The overall investigation through this research was determined to be successful.