

## **Executive Summary**

Over the course of the 2013/2014 academic year, The Office Building was analyzed to see if any alternative systems could be implemented to save time or cost. Multiple benefits were uncovered through these explorations, and replacement strategies were developed.

Because the support of excavation was such a vital part of The Office Building, it was important to research various types of retaining structures. Sheet piles, soldier piles and lagging, slurry walls, and top down construction were all examined and the advantages and disadvantages were discovered. This research was used throughout the first two analyses to help choose alternative designs.

The first analysis evaluates the foundation walls of the project. The original design consisted of Cast-in-Place concrete with the soldier piles and lagging used. Because of the complex support of excavation, the CIP concrete wall system had extremely long durations and high labor costs. The proposed system substituted shotcrete in for the CIP concrete. A structural breadth was done to calculate the loads on the foundation wall. The shotcrete substitution saved over \$77,000 and accelerated the schedule by 33 days.

Analysis 2 examined the secant wall on the west end of the project. It was thought that the secant wall had a long schedule, and wasteful costs. A slurry wall was analyzed as a replacement to the secant wall. This second analysis did not meet the original expectations. It was believed that the slurry wall would save a small amount of cost and accelerate the schedule. After the analysis was performed, the slurry wall ended up costing over \$190,000 more and had the same duration as the secant wall.

The final analysis was done on value engineering and primarily looked at cost, with a little regard to the schedule. The main electrical feeder was the depth studied. The original copper wiring was compared to aluminum wiring as well as aluminum busway. For an electrical breadth, the aluminum wiring and busway were both sized. Once sized, the systems were compared. It was determined that the aluminum wiring would save a total of \$83,000 but take an extra four days. The aluminum busway was found to save just under \$138,000 and accelerate the schedule by five days.