

Executive Summary

Over the course of the 2012/2013 academic year, Office Building 1 of the CityCenterDC development was analyzed to identify areas in which alternative solutions in either construction or design would enhance the project. Through feedback from the project team, independent research, and multiple site visits, three major areas were chosen for additional analysis. The following report presents the three analyses performed as part of the final senior thesis project. It is important to note that the purpose of this thesis and analysis is strictly educational and is not intended to critique the project team in any way.

Analysis #1: SIPS

The first analysis looked to create a new phasing and scheduling plan for the typical floor construction, and implement the results through a Short Interval Production Schedule. The repetitive nature of the activities on each floor allowed for specific crews to be assigned to specific tasks that would repeat on each floor. A reorganization of the activities and new floor logistic planning optimized the efficiency and use of each area. As a result, the schedule was shortened by 13 days and savings from general conditions were estimated at \$20,524.40. More importantly, the schedule acceleration would allow the owner to lease the property quicker, resulting in earlier payments from the tenant.

Analysis #2: Construction Analysis of Electrical Redesign

Investigation into the existing electrical distribution system revealed that the power density was nearly twice as high as generally designed for. As a result, a thorough redesign of the electrical distribution system for Office Building 1 was performed (Breadth 1). A construction analysis of the results revealed that the new design would produce savings of \$120,940. The electrical riser work schedule can be cut in half or the work force reduced. A constructability analysis of the new system revealed that a total of 182 labor hours will be saved and that the proposed equipment will be easier to install.

Analysis #3: Alternative Footbridge Construction Method

Five steel footbridges span between Office Building 1 and Office Building 2. Each bridge serves as an enclosed walkway from one structure to the other. The chosen method of construction consisted of prefabricating the bridges onsite and lifting them into position using a 500 ton mobile crane. Although the method proved successful, many challenges were encountered which led to additional resource use. This analysis proposes the use of VSL Heavy Lifting technology to install the footbridges. This system uses four hydraulic jacks located at the top of the building to lift each footbridge into place. Bridges will still be prefabricated onsite, but no crane will be required. After ensuring the structural integrity of the building was not compromised (Breadth 2), it was found that the proposed system would produce savings of \$350,000. The original start and finish dates will not be affected, as this system will neither save nor delay the schedule.