

## Executive Summary

The Senior Thesis Final Report serves to discuss the research and conclusions of four analyses conducted on Phase II of the Fort Pickett Regional Training Institute. The project entails the design and construction of three billeting buildings for the Virginia Army National Guard that total 116,400 SF. The four analyses aim to target problematic schedule concerns through the use of modularized construction, prefabrication techniques, scheduling practices, and innovative technology.

### *Analysis #1: Modularization of Bathroom Units*

The first analysis looked to minimize the difference in time and work between the construction of the bathrooms and bedrooms in the field. In order to bridge this gap, the use of modularized bathroom units was investigated to shift the work from the field to a manufacturing facility. The analyses resulted in an eight week acceleration of the fit-out schedule and an estimated \$213,903 in savings. Additionally, the pods were found to display superior quality in comparison to typical work performed in the field, an item that was of constant concern on the project.

### *Analysis #2: Implementation of Short Interval Production Schedules*

The second analysis investigated the use of short interval production schedules (SIPS) on the project, in order to help mitigate the risk involved with erecting the precast hollow-core planks. The SIPS was believed to improve the productivity and flow of work from building to building. The analysis showed a shortening of the work sequence by 11 days and saved \$117,524.

### *Analysis #3: Feasibility of Precast Exterior Façade Panels*

The third analysis aimed to reduce the building enclosure schedule by replacing the field constructed CMU veneer with precast concrete panels that are constructed off-site. In order to alter the veneer, the design needed to be altered, which in reality would need to be considered by the impacted parties. Additionally, the panels were tested to investigate the structural and mechanical implications of the use of the precast panels. After conducting a thorough analysis, the panels were believed to be well in the best interest of the project team by reducing the enclosure schedule by 10 weeks and saving \$1,094,129.

### *Analysis #4: Integration of Material Tracking Technologies*

The fourth analysis aimed to enhance the coordination within the material management of the precast hollow-core planks. This activity acted as the most critical schedule item, making the planks a key area of focus. To combat the risk associated with the planks, material tracking technology was investigated for its potential benefit on the Fort Pickett project. After conducting a complete analysis, the material tracking system cost an estimated \$9,300, an insignificant figure compared to the future costs associated with rectifying a potential delay in the schedule from mishandled or wrongly manufactured precast floor planks.