

## Executive Summary

In **analysis 1**, there were a few reasonable assumptions made about what part of the schedule can be combined to incorporate the general contractor in earlier. The general contractor could come in at 35% of design development which will give enough time for the owner to input their ideas into the design before the design builder took over. Judging by the assumptions made, 315 days could be saved and construction could begin August 3, 2010 rather than October 31, 2011. This savings proves that the delivery method design build is a better option.

**Analysis 2** demonstrated a SIPS of the overhead mechanical ductwork in the large labs. After creating a few different SIPS options, the most efficient schedule was decided on. The third SIPS saved the schedule 21 days, which is about a month of work. If the hourly rate was \$39.93 per sheet metal worker, then the original SIPS cost would have been \$829,703. SIPS 3 totaled \$896,924, which turned out to be the closest to the original cost and the lowest cost out of the three options. Using this SIPS for overhead mechanical rough-in would be recommended.

The façade study in **analysis 3** also produced savings in both cost and schedule. By changing the composite metal panels, corrugated metal panels, and non-operable louvers to fiber cement siding, saved 18 days. Changing the brick to cast in place concrete saves five days. The architectural breadth shows the changes being made and the justifications of them. A mechanical breadth verifies that the R-value will improve and that condensation will not get into the wall. The cost was a savings of \$293,630 and the total duration was reduced by 23 days. The proposed changes are recommended even though the aesthetics are changed a bit.

The **4<sup>th</sup> analysis** was on implementing BIM into the project. There were a few BIM uses that would have made planning, design, construction, and operation go smoother. 4D modeling, design review, construction system design, and coordination would have helped with all of these stages. Each of these BIM tools would have reduced the schedule in some way, especially if some of these were implemented before construction. The final part of this analysis was BIM focusing on facilities management. The software used to for asset management will help save time for the facilities manager.

By creating a new schedule out of these analyses, there is a great schedule reduction. The façade changes and SIPS save a total of 44 days, which is two months. With the alternative delivery method of design build, 315 days can be saved. These analyses bring the total scheduled savings to 359 days. This number can vary based on when construction actually starts. With these new durations, the construction for the Environmental Studies Lab: Expansion has the possibility of being turned over by November 15, 2011.