## Section 1 - Executive Summary

This report focuses on four construction related analyses of the Pearland Recreation Center and Natatorium building in Pearland, Texas, a Houston, Texas suburb. Two of these four construction related research topics also include a structural analysis and a mechanical analysis. In addition to these analyses this report also contains an overview of the project, including a summary of the project team, the building systems, construction cost, construction schedule, and construction logistics.

Analysis #1 considers replacing the glulam structural system in the natatorium with a concrete column and steel joist structural system. This analysis included a feasibility study as well as a structural analysis to design the structural members. Results from this analysis reflect a construction cost savings of over $600,000 by using the proposed concrete and steel system. Additionally, there are no changes in the construction schedule.

The next analysis looks at replacing the as designed air-cooled chiller mechanical system with a water-cooled chiller and cooling tower mechanical system. This study also includes a mechanical analysis. This study reveals a $48,500 construction cost savings and a $248,000 yearly energy cost savings by using the proposed water-cooled chiller and cooling tower system. Again, this modification has no construction schedule implications.

Next the project team's interaction is analyzed, primarily focusing on the effects of the delivery method. Design-bid-build, the delivery method being used on the project, appears to have resulted in a successful project with no adversarial relationships developing. This project is compared with another project being constructed by the same owner but using the design-build delivery method. It is determined that design-bid-build is the preferred delivery method for public projects, particularly when they are complex such as the Pearland Recreation Center and Natatorium project.

Finally an investigation of the glulam column connection with the concrete footers in the natatorium is conducted. Constructability of the as-designed bolted connection is quite difficult during column erection, as precisely aligning the columns with the bolts is challenging. This analysis considers modifying the connection to a welded connection. Using a welded connection results in no additional construction costs and has no effect on the construction schedule. However, a welded connection would have been much easier to construct.