Executive Summary

This Senior Thesis Final Report is intended to discuss the procedures and findings of three in-depth analyses performed on the Thames St. Wharf Office Building (TSW). This project includes the base building construction of a 277,000 SF seven story office building in downtown Baltimore, MD. A 135,000 SF tenant fit out on floors four through seven of the base building were also included as an addendum to the original construction contract is. The connecting theme between all of the analyses is the benefit of having a more integrated design and construction process.

Analysis I: Critical Industry Issue, Integrated Project Delivery (IPD)

The building industry is the only non-farming industry in the United States that has declined in productivity and efficiency over the last 30 years. This is partially due to the way projects are currently being delivered. The design-bid-build delivery method causes people to work against each other on a project to protect their bottom line rather than working with each other for what is in the best interest of the project. Integrated project delivery addresses and corrects this issue. This analysis describes in detail the issues with design-bid-build, how integrated project delivery works, its benefits and drawbacks and the effects of IPD on TSW. The analysis shows that had TSW been delivered using IPD many of the issues that occurred on the project could have been prevented or corrected more easily. Furthermore if IPD was used as the projects delivery method, the project would have been higher quality and completed in less time.

Analysis II: Façade Evaluation and Redesign

TSW's façade is comprised of 95% glazing and the southern façade is almost 99% glazing. This leads to high cooling loads during the summer months as the solar loading on the building increases, increasing the building's operation costs as well as increasing the size of the mechanical system needed to effectively cool the building. If the project had been delivered with a more integrated design process the mechanical engineer and architect could have worked together to design a more sustainable building. This analysis shows that by switching the glazing to a higher performance glazing the envelope cooling load can be reduced by 26% while only increasing the first cost of the system by 3%. This analysis also includes the MAE study required for the integrated BAE/MAE.

Analysis III: Mechanical System Evaluation and Redesign

The mechanical system that was installed in TSW was the most expensive line item in the contract with a cost of $10.2 million, almost 20% of the total project cost. The focus of this analysis was to use the reduced cooling load from Analysis II to reduce the first cost of the mechanical system. This analysis shows that with the smaller cooling load the mechanical system is able to be reduced by $244,000 which more than makes up for the extra costs associated with the higher performance glazing. It also describes how unforeseen design conditions from the owner, tenant and building itself prevented the system size, cost and type from being decreased further.