Mechanical Systems Redesign Report – Updated

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Executive Summary

The Hilton Hotel at BWI Airport is a full-service hotel located less than two miles from the BWI Airport in Linthicum Heights, Maryland. The 277,000 sf building will cost about $27 million for design and construction. The ground and second floors of the building are serviced by four air handling units through a variable air volume system with hot water reheat coils at the boxes. The third through eleventh floors of the guest room tower have 280 guest rooms with individual water source heat pumps. Rooftop units provide 100% outdoor air to the guest room corridors, service areas, laundry rooms, and kitchen.

This report clearly details the proposed ideas for replacement and improvement of the BWI Hilton's mechanical systems. After several alternatives are discussed, the proposed redesign is described. The thesis proposal looks at redesign issues for both the main floors as well as the guest room tower. These include the replacement of the existing VAV system with parallel systems and a run-around heat recovery system in the guest room tower. The other part of the redesign deals with the research for improvement of the indoor air quality for the guest rooms.

In addition to the three main depth areas of the thesis proposal, two breadth areas are also developed. The first area deals with the replacement of incandescent downlights in the meeting rooms and guest rooms with compact fluorescent fixtures to achieve energy savings while maintaining the original light output. The second breadth area is a study of the acoustics in several critical spaces in the BWI Hilton. Sound pressure levels in the guest rooms from the water-source heat pumps will be evaluated. Noise criteria levels and sound transmission class ratings of certain wall constructions will also be studied.

The solution methods, tasks, and tools to be used during the research and development stages of the thesis redesign process are outlined for each of the depth and breadth areas. A new software program, BLCC4, will be learned and then used to calculate the life cycle costs the proposed systems. Carrier's Hourly Analysis Program and Microsoft Excel will be used extensively throughout the entire project. A detailed schedule is also laid out for each of the four months during the thesis redesign process.