

1.0 Executive Summary

The following report has been prepared to determine the benefits of implementing a Dedicated Outdoor Air System (DOAS) in conjunction with Active Chilled Beams (ACB) and DOAS Fan Coil Units. This system will be placed with the current hydronic VAV system and compared with the as designed documents.

To begin, an overview of the building is provided. The existing mechanical system design as well as operational forecasts were analysed closely to provide a benchmark for comparison. The proposed system is then described followed with the actual design.

The redesign started with a summary of preliminary research on the units which would be used. Using Trane TRACE 700 block analysis and required ventilation rates and design temperatures to determine the buildings loads. With this determined, humidity ratios as well as cooling coil loads. The sensible cooling capacity for the supply was determined and subtracted from the total sensible load to find the ACB load. It was determined that 1,277 2'x4' ACB's would be needed.

Resizing of the existing mechanical system was conducted and cost analysis performed. Though information was limited, a payback of 9 yrs was determined. Energy analysis showed this system provided a 24% reduction in load, however, the system and this payback could be undesirable for the owner. As this is a Government project, this might not be the case.

An analysis on the impacts on cost and scheduling was investigated to determine how this system would affect construction. The nature of the building offered interesting acoustical studies, one particular space (SCIF), required acoustical isolation for security purposes.