Gallaudet University
Sorenson Language and Communication Center

TECHNICAL REPORT 3

MECHANICAL SYSTEMS
EXISTING CONDITIONS EVALUATION

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EXECUTIVE SUMMARY

The Sorenson Language and Communication Center (SLCC) on the Gallaudet University campus in Washington, DC is a one-of-a-kind facility designed for the deaf. Its visu-centric design appeals to the visual communication and way of being within the deaf culture. The owners want the building to be an example not only for other deaf building projects, but also for its energy efficiency and sustainability. The mechanical system in particular is charged with meeting these criteria.

The 87,000 SF facility is served by six (6) Trane M-Series Climate Changer Air Handing Units. Each unit serves a distinct zone within the facility that is unique in use and occupation schedule. The spaces served include classrooms, offices, conference rooms, computer labs, media studios, therapy rooms, audiology labs, and typical support spaces. VAV terminal units with hot water reheat control airflow and supply air temperature to each zone. Chilled water from the Central Utilities Building directly serves the cooling coils in the system. High pressure steam service also comes from the Central Utilities Building and heats the heating hot water and domestic hot water through heat exchangers.

The ventilation rate procedure explained in ASHRAE Std. 62.1 Section 6.2 was used to evaluate the HVAC design of the SLCC. The building envelope and lighting power density requirements explained in ASHRAE Std. 90.1 Sections 5 and 9 were also used to evaluate the design of the SLCC. Additionally, the LEED-NC V2.2 and V2.1 Reference Guides were utilized as well to compare the design of the SLCC for its compliance with each standard. Finally, Carrier's Hourly Analysis Program (HAP) 4.2 was used to build an energy model of the building for analysis. Supplemental analyses for lost "rentable" space and mechanical system first cost were conducted. The input numbers were derived from mechanical drawings, narratives, and calculations provided by the primary architects and MEP engineers at SmithGroup.

The calculations and evaluations performed in this report show that the design for the SLCC meets the criteria for ASHRAE Std. 90.1-2004 compliance, but not Std. 62.1 compliance. The facility would gain a LEED Certified Rating per LEED NC V.2.2. All assumptions, procedures, calculations, analyses and conclusions regarding the design of the SLCC mechanical system may be found within the previous technical reports.

This report finds that the overall the design of the SLCC mechanical system is efficient and practical. Energy saving equipment such as variable speed drives for fan and pump motors and energy saving techniques such as zoning help reduce total energy consumption. Also, the building envelope, glazing, and roofing decisions reduce energy lost/gained from the environment. However, there is room for improvement in the energy efficiency, acoustics, and system access of the SLCC. The goal for this thesis will be to improve the energy efficiency of the building and to address these acoustical issues.