Thesis Proposal

Richard T. Flood Jr. & Sally Elliot Flood Athletic Center
Salisbury, CT

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Mechanical Option

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1.0 Executive Summary

The assignment required AE 481 students to organize the information from technical assignments and make a proposal to redesign the mechanical system.

New proposed mechanical systems in Richard T. Flood Jr., & Sally Elliot Flood Athletic Center are additional air handling units, combined heat and power system, combined energy usage in gymnasium and dorms, and desiccant wheel system. Considering the building is school facility, the all of mechanical systems are applicable. Initial cost will be higher than current system, but since the school buildings are used for extended period of time, lower operating costs will pay back.

The timetable of next semester is attached according to the proposal.

2.0 Background

Richard T. Flood Jr., & Sally Elliot Flood Athletic Center is 102,000 square feet gymnasium building. The gymnasium is two story multifunctional building that consists of basketball courts, offices, squash courts, wresting rooms, locker rooms, storages, and hockey rink. The building is a part of Salisbury School facilities and located in Salisbury, Connecticut.

The building has (9) air handling units and (1) ventilating and dehumidifying unit for ice rink. Each of air handling units is located near the serving area. Table 1 explains how big the space is for each unit to serve and how many units were used for each space.

Function	Area	# of AHU
Basketball court	15026 ft^2	2 AHU
Offices	5965 ft^2	2 AHU
Squash court	14160 ft^2	1 AHU
Wrestling room with locker room spaces	6454 ft^2	1 AHU
Weight room with locker room spaces	6178 ft^2	1 AHU
Storage	3883 ft^2	2 AHU
Hockey rink	20700 ft^2	1 AHU

Table 1

Figure 1

Figure 2

Figure 1 and Figure 2 describe the function of the spaces in the building. Figure 1 is a sketch of first floor of the building and Figure 2 is a sketch of second floor of the building.

Basketball court and ice rink create big atrium spaces in the building. The building will have high reverberation time and create echoes. 25 Vibro-Accoustics tiles are used to reduce the reverberation time.

3.0 Design Consideration

Additional AHU

Richard T. Flood Jr., & Sally Elliot Flood Athletic Center is designed to comply with ASHRAE Standards 62.1 and 90.1. The calculation in technical writing one proves that squash court and wrestling room with lockers lack outside air. Considering a lot of visitors to watch the competition in squash court and wrestling room, more air handling units in those facilities should be installed.

Combined heat and power system

The CHP system uses the natural gas to produce electricity. While producing electricity, the heat will be generated and used as the space heating of the building. Payback period is long but combined heat and power system is applicable because school buildings will be used for a long time.

Combined energy usage of gymnasium and dorms

The gymnasium is used from afternoon to early evening and students living in the dorm use the power in the morning and evening. Combining the power generating system of two facilities will be more efficient because power generation will be running at all times.

Desiccant wheel system

Since the facility consists of ice rink, desiccant wheel system will save the power to dehumidify the building.

4.0 Breadth Proposal

Acoustical Breadth

Installation of additional air handling units and desiccant wheel system will cause more noise and affect offices and competitions. Considering the big atrium in the building, acoustical tiles and baffle hanging system can be applied.

Structural Breadth

Fire protection in the building can be reevaluated due to the installation of desiccant wheel system, combined heat and power system, and desiccant wheel system. Additional spaces in the building can be required due to the installation of more mechanical equipment.

5.0 Timetable

	Start Date	End Date	Tasks
Week 1	Jan 11 2010	Jan 17 2010	Research
Week 2	Jan 18 2010	Jan 24 2010	Research
Week 3	Jan 25 2010	Jan 31 2010	Mechanical Redesign
Week 4	Feb 1 2010	Feb 7 2010	Mechanical Redesign
Week 5	Feb 8 2010	Feb 14 2010	Mechanical Redesign
Week 6	Feb 15 2010	Feb 21 2010	Mechanical Redesign
Week 7	Feb 22 2010	Feb 28 2010	Mechanical Redesign
Week 8	Mar 1 2010	Mar 7 2010	Breadth Work
Week 9	Mar 8 2010	Mar 14 2010	Spring Break (Catch up)
Week 10	Mar 15 2010	Mar 21 2010	Breadth Work
Week 11	Mar 22 2010	Mar 28 2010	Organize the information
Week 12	Mar 29 2010	April 4 2010	Presentation Preparation
Week 13	April 5 2010	April 11 2010	Presentation Preparation
Week 14	April 12 2010	April 18 2010	Presentation