



Thesis Proposal
20 December 2006

Executive Summary

During the 2007 spring semester, I will be analyzing and redesigning several aspects of Boston University's Arena and Recreation Center building systems. Throughout the semester I will be conducting an in depth study of the lighting, electrical systems as well as two breadth topics for the Arena and Recreation Center. The process will analyze the existing conditions and then look into an alternative design approach.

Within the proposal I will discuss the four spaces in which the lighting will be redesigned such as the executive club room, main lobby, four-court gymnasium, and exterior plaza. The design proposal for the four spaces was mentioned in Technical Report Three and the final redesign will include a reevaluation of the spaces after receiving comments from industry members at Lutron Presentations. The electrical system analysis, as well as the two breadth topics, mechanical and construction management, will also be discussed.



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Depth Work: Lighting Design

Boston University's Arena and Recreation Center was designed with the original intent to be the "central hub of activity" in the heart of campus. The Arena building includes an ice hockey rink, a black box theater, offices, locker rooms, as well as an executive club room. The Recreation and Fitness Center building includes several work-out centers, gymnasiums, multi-purpose classrooms, a black box theater, rock climbing wall and two different use pools. In keeping with building uses, my main lighting design concepts will focus around "life, energy, motion, pride, determination, youth, and fresh." Each space will try to bring out the major design concepts as well as the individual concepts.

The executive club room, located on the second floor of the Arena, is meant for VIPs and special Boston University donors. The room is a multipurpose space ranging from activities such as viewing sporting events on the large flat screen televisions, formal evening events, as well as a comfortable lounge space. The new lighting design will incorporate a flexible system to accommodate the different uses. It will also include a daylighting control system due to the large south facing windows. The lobby and exterior lighting will incorporate a lighting system that appears to be in motion by using lines of light. The intent is to guide people through the spaces as well as bring out the school colors of Boston University. The four court gymnasium is a large space with an elevated track and large, floor-ceiling south facing windows. The new lighting system will include daylighting controls and dimmable fixtures to minimize energy and maximize the daylight entering the space.

After presenting the lighting proposal to designers at Lutron, I have heard many valuable comments and suggestions. Their remarks will be taken into great consideration while redesigning the lighting within the four spaces.



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Depth Work: Electrical

The electrical redesign will look into the four spaces that are being re-lighted and analyze the branch circuit distribution. All areas will need to have new panelboard schedules with the new lighting loads. The new panelboards will have to be resized and possibly have a new layout. On top of a panelboard analysis, all feeders and branch circuits affected by the lighting re-work will be resized and laid out. I will also incorporate control systems that integrate the daylighting and new lighting design within each space.

An examination of the existing transformers will also take place with the hope the new design will become more energy efficient. Based on the mechanical redesign, additional loads may require new distribution equipment and protective devices, which will include a section of the building and the main distribution equipment. I will also conduct a protective device coordination study that addresses a single-path through the distribution system and includes short circuit current calculations.



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Breadth Work: Mechanical

Located in the Recreation Center, I will be redesigning the lighting for the gymnasium. I plan to add clerestories as well as glazing on the south-facing windows. I will then analyze the effect the two changes have on the HVAC system design. The added glazing could affect the ASHRAE Standard 90.1 as well as the designed heating and cooling loads for the space.

Breadth Work: Construction Management Cost Analysis

Once the redesign of the electrical, lighting, and part of the mechanical systems are complete, I will take a look into cost comparisons of the existing system to the new system after labor and installation. I will use this analysis to see if the new system will be more beneficial for the client.

After speaking with the superintendent on the job, several value engineering and constructability issues arose while on the job. One of which was the concourse ceiling which is a custom cut radius metal panel ceiling that required the lights to fit perfectly. To better this value engineering issue I will look into a high-end ceiling grid system with lay-in fixtures and compare the cost of the new and existing systems.



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Schedule

Jan 15-19	Final all 3D models
Jan 20-22	Finish all equipment research for the lighting (IES files and cutsheets)
Jan 23-28	Start running AGI calculations to check illumination levels in all spaces
Jan 29-4 th	Finalize AGI renderings
Feb 5-11	Redesign branch circuit analysis for lighting spaces
Feb 12-18	Research mechanical equipment loads used in redesign to coordinate electrical study
Feb 19-25	Finalize central transformer analysis and protective device study
Feb 26-4 th	Perform mechanical and cost analysis breadth work
Mar 5-9	Finalize mechanical and cost analysis breadth work
Mar 10-18	Spring Break- South Beach! HAVE FUN in the SUN!!
Mar 19-25	Create floor plans, electrical plans, and control diagrams
Mar 26-31 st	Finalize renderings and group data into tables and schedules
Apr 2-8	Create PowerPoint presentation and write thesis report
Apr 9-15	Prepare for Presentation
Apr 16-20	Thesis Presentations