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Thesis Design Proposal

## **Design Proposal**

### Executive Summary:

The design proposal I have drawn up for my thesis is comprised of two main components: the depth work, and the breadth work. The depth work will be further broken down into two other elements, namely the lighting depth and the structural depths. The lighting depth will consist of a redesign of 4 spaces. These spaces are the building lobby, the concession area, the fitness center, and the building top tower. The electrical depth will focus on the necessary changes and alterations due to the lighting redesign, as well as two price comparisons; one dealing with the advantages and disadvantages of an aluminum wiring system, and the second regarding the use of high efficiency transformers. The remaining work to be done is in the field of the breadths of my thesis. The two breadths that I will perform will be on relocating the mechanical equipment that is currently overhead the competition pool, and the second will be a cost analysis of the entire project from a construction management point of view.

### Depth Work: Lighting

Rochester Institute of Technology's Gordon Fieldhouse and Activities Center is a multipurpose facility on the campus of the university located in Rochester, NY. The complex houses facilities for competitive and recreational sports, swimming, and fitness, as well as capabilities of transforming the Fieldhouse area to a concert or speaker's venue. Additionally, the Fieldhouse hosts annual convocation and commencement ceremonies for incoming and outgoing students. At 160,000 square feet and \$25,000,000 in total cost, the Fieldhouse is one of RIT's campus "gems" and showcases the school's commitment to progress and quality.

The lighting design of the Fieldhouse is by no means inadequate, but as can be expected, budget and coordination problems kept the design from being ideal. It is the intention of this thesis project to expound upon these shortcomings and introduce new solutions to provide for this facility the best lighting solution possible.

In the process of completing Technical Report #1, the existing lighting conditions were established, analyzed, and constructively criticized. In the process of Technical Report # 3, schematic solutions were explored and presented to members of the lighting design community for feedback and development of ideas. Armed with that advice, the next step is actual implementation of the design proposals. For each of the four spaces I

have chosen to redesign, my goals will include practicality, aesthetic satisfaction, and efficiency.

The first space that was included in this report is the entrance lobby. The current lighting design employs the use of downlights installed in two acoustical panels suspended from the ceiling. The overall look of the space is somewhat plain and it is my opinion that the entrance of the building should create a very positive first impression to its visitors. I plan to “spice up” the design with the incorporation of a hanging pendant system suspended from the ceiling and passing through the acoustical panel by way of punched holes mimicking the shape of the luminaire. Additionally, I’d like to explore the idea of uplighting the ceiling from the top of the panel. Furthermore, the downlights currently installed in the lower panel could be more efficiently used in the lighting system if they were connected to a daylight harvesting photosensor system, as the panel is located above an area that receives a good amount of sunlight from nearly glazing. Finally, another goal is to integrate some added emphasis to the reception desk and other important areas in the space. I plan to incorporate colored LED’s to backlight wayfinding signage and school paraphernalia in some of these areas.

The next space requiring attention is the currently roughed in concession area located adjacent to the fieldhouse’s second story corridor. This immediately seemed a wonderful opportunity to play with some more creative aspects of lighting design as this is primarily a sales venue and should be treated with as many sparkle and attention grabbing strategies as appropriate. The employment of color was chosen to draw in potential customers by way of visual interest and pains will be taken to avoid lighting the actual wares in artificial hues; rather, the colored LED wallwashes would be limited to an uplighting application of the walls only and avoid the merchandise all together. On the customer side of the room the lighting should be as catchy as possible while still being classy and fit in with the remaining areas of the lighting design. On the vendor’s side the lighting should be a propagator for comfort and efficiency of the workers under its glow.

The third space chosen for redesign is the fitness center, a double heighted space for much of its massing and adjacent to a large portion of glazing. The focus in this space is improving the use of energy savings by again using natural daylight as much to the advantage of the facility as possible. Also, visual comfort and safety for the occupants of the fitness center were taken into consideration. The solution of recessed indirect lighting on photosensor dimming will be explored and implemented into this space. Additionally, the presence of the blue ceiling will be highlighted as an aesthetic feature to once again showcase RIT during daytime and nighttime viewing.

Finally, the tower atop the entrance lobby will be addressed as the final lighting space attempting improvement. The current design looks marvelous from a distance but once up close, fixtures are very apparent and visible, causing the overall effect to suffer. It is my intention to replace the current lighting system with color changing LEDS to add a new element to the outside of the Gordon Fieldhouse. One idea is that the colors can have a sort of dialogue with the community of the RIT campus by associating specific colors with the activities taking place in the building at the time. For example, if a large

swim meet was in town, a blue, green and purple scheme could be used. If an RIT event was taking place, like commencement, oranges could be employed as a tribute to the University's school colors. With this addition, the Fieldhouse would be an even more prominent and impressive presence on the RIT campus.

#### Depth Work: Electrical

For the depth work for my electrical portion, I have a few plans that need to be developed slightly further. At present, I plan to provide calculations and sizing for the new lighting systems designed in the aforementioned paragraphs. Next, I plan to perform the necessary calculations to compare and contrast the benefits and downfalls of implementing an aluminum wiring system in place of the copper wiring the building has now. Thirdly, I plan to perform a cost/benefit analysis on the use of high performance and efficiency transformers in place of the standard ones used now.

#### Breadth Work: Mechanical

During my visits to the building and my discussions with the engineers, it came to my attention that due to an oversight the air handling units serving the competition pool area were placed last minute directly overhead the swimming area. Not an issue immediately prevalent, it took some time to discover that service and repair to this equipment was exceedingly difficult due to the lack of accessibility. It is necessary to involve the use of a genie and several personnel on standby for safety purposes and the overall hassle of routine maintenance on each of the units becomes a large obstacle for the facilities team every few months. I have chosen to relocate these units and address the subsequent reducing of the systems for the mechanical breadth of my thesis work.

#### Breadth Work: Construction Management

For my other breadth analysis I have chosen to compare the estimated and actual cost summaries of the building process for the Gordon Fieldhouse. As it turned out, the project was completed on time and on budget, and I'd like to assess just how that came about and find which aspects of the management plan were implemented for this success. Additionally, I'd like to make a thorough progress report of what happened at each step along the way and how the different project teams were integrated to make sure that the end result complemented the original objective.