

Executive Summary

The following report is an account of all work and analyses performed during the AE487G senior thesis. This thesis includes a redesigned lighting solution for four spaces, an electrical depth, a MAE daylighting depth, an acoustical breadth and a landscape architecture breadth. The building chosen for study is The Winsor School Lubin-O'Donnell Center for Performing Arts, Athletics and Wellness. All of the analyses and designs were performed within the four design spaces which are as follows:

- + Wellness Plaza
- + Wellness Lobby & Corridor
- + Dance Rehearsal Room
- + Performing Arts Theatre

As stated in the Building Statistics report, the Winsor School is a day school for young women in grades 5 – 12 located in Boston, Massachusetts. The school's mission is to drive young women towards their aspirations and dreams while also teaching them how to be independent and confident leaders. This building features an abundance of fitness centers, performance spaces, rehearsal rooms, meditations rooms, gymnasiums and squash courts.

The building is a modern design built on a campus filled with classical traditions and the goal of the lighting design was to continue and project that feeling of a modern classic. The new Wellness Plaza landscape architecture design merges the model main lawn with modern techniques in a fresh linear fractal design. The playful and relaxing plaza creates movement through design and even features an artistic musical sculpture that doubles as welcome signage to the new building. The lighting highlights the modern elements in the plaza with low level uplighting while the entrances exhibit higher light levels to create circulation in the space. The Wellness Lobby and Corridor features a complete redesign of the daylighting system, implementing occupant controlled rotating shading devices and a light shelf to bounce light onto the ceiling, indirectly lighting the space. The strategy reduces the potential glare for an individual in the lounge area from an intolerable glare level to an imperceptible glare level. This daylight is then replicated at night with the lighting, playing on the traditions of introducing and filtering light into a space that is easily found in many past classical designs. The Dance Rehearsal Space incorporates a modern grand ceiling supplemented with points of light that create sparkle and visual interest to produce a jeweled focal point for all those who pass by or enter the room. An acoustical redesign was performed in this space to produce clarity in speech and meet classroom standards with a final reverberation time of six-tenths of a second. The last space, the Performing Arts Theatre also incorporates the appeal of a grand ceiling but instead creates this ceiling with color changing points of light along the underside of the catwalk. The theatre lighting also supplements the architecture by grazing and washing the intricate wood slat system that covers the walls of the space.

The electrical design system features a redesign of the branch circuits based on the above changes to the lighting design. A short circuit study was conducted along one of these branches to evaluate safety in overcurrent and power outage situations. The result proved the design was still efficient at preventing a short circuit. Finally, an electrical cost analysis was performed to see whether savings could be produced by switching unnecessary mineral insulated cable to metal clad cable. The results indicated that by switching one branch circuit feeding four panelboards from MI to MC Cable, the cost of the wiring in that branch circuit could be reduced by seventy-eight percent.

The end result of this thesis creates an integrated and modern design that keeps with classic traditions to move The Winsor School into the future and cement its status as prominent women's preparatory school for decades to come.