



The Winsor School

Centers for Performing Arts and Wellness Academic Wing

103 Pilgrim Road, Boston, Massachusetts

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Lighting / Electrical

Lighting Advisor – Richard Mistrick

Electrical Advisor – Gary Golaszewski

Technical Report IV // Proposal

December 12th, 2014

Executive Summary

The Winsor School was chosen to be the focus of this thesis and, in particular, the Lubin-O'Donnell Center for Performing Arts and Wellness Building. As stated in the Building Statistics report, the Winsor School is a day school for young women in grades 5 – 12. 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 report below calls out these spaces in particular to specifically be the center of the redesign throughout the course of this year:

- + Dance Rehearsal Room
- + Theatre Assembly
- + Wellness Lobby & Corridor
- + Courtyard Plaza

The overall concept for the lighting design is based upon the modern take of the new wing as compared to the classic New England style of the pre-standing building. Taking the themes and feeling of the classic styles and design, then giving them a modern twist for the new generation of the Winsor School. Furthermore, each space, though interconnected within the building, will also have their own individual atmosphere and personality that will be reflected in the lighting design. The Wellness Lobby, in particular, will be evaluated for daylighting designs. Currently the only supplement to the southwest facing curtain wall is fritted glass. This will be analyzed and assess for further passive daylighting solutions. This design will draw from concepts learned in AE 565.

In response to the lighting redesign, affected parts of the electrical system branch will be redesigned to account for the new loading. Also, a short circuit analysis will be performed for one of the main electrical distribution paths and the emergency systems will also be redesigned and integrated together, instead of remaining on a standby and emergency paths.

Finally, two additional breadths outside of the lighting/electrical discipline will be as follows. The theatre acoustics will be re-evaluated for changes in reverberation based on the redesigned systems. Furthermore, a landscape architecture breadth will be employed to redesign the plaza to better reflect the concept and the architecture of the new wing.

This technical report concludes with an outline of a potential schedule for accomplishing this design in the spring semester. The schedule ends with the final presentation during the week of April 12th.

TECH REPORT FOUR

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TECH REPORT FOUR

Building Overview

BUILDING NAME

The Winsor School | Centers for Performing Arts and Wellness Academic Wing

LOCATION AND SITE

103 Pilgrim Road | Boston Massachusetts

BUILDING OCCUPANT NAME

The Winsor School

OCCUPANCY OR FUNCTION TYPE

Theater (A-1), Exercise Spaces (A-3), Offices (B)

The new wing is the performing arts and athletic wing connected to the academic portion of an all-girl preparatory school for young women in grades 5-12.

SIZE [TOTAL SQUARE FEET]

79,000 sf

NUMBER OF STORIES ABOVE GRADE | TOTAL LEVELS

Three Stories above grade | Five Total Levels

LIGHTING RELEVANT PROJECT TEAM

Architect: William Rawn Associates, Architects, Inc. | <http://www.rawnarch.com>

M / E / P / FP Engineer: Rist-Frost-Shumway Engineering, P.C. | <http://www.rfsengineering.com>

Landscape Architect: Landworks Studio Inc. | <http://www.landworks-studio.com>

Theatre Consultant: Theatre Projects Consultants | <http://www.theatreprojects.com>

Code Consultant: Sullivan Code Group | <http://www.rwsullivan.com/services/code-consulting>

Lighting Consultant: Horton Lees Brogden Lighting Design | <http://www.hlbldesign.com>

Sustainability Consultant: The Green Engineer | <http://www.greenengineer.com/>

DATES OF CONSTRUCTION

May 2013 – September 2015

ACTUAL COST INFORMATION

Total Construction - \$71,000,000

Electrical / Lighting - \$7,200,000

PROJECT DELIVERY METHOD

Design - Bid - Build

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Lighting Depth

The lighting depth of this design will focus on four spaces of the Winsor School in the Lubin-O'Donnell Center for Performing Arts. The four spaces are the Performing Arts Theatre, Wellness Lobby and Corridor, Dance Rehearsal Room and Wellness Entrance Plaza.

CONCEPT



A modern take on the classics...

The main theme of the building stems from the apparent juxtaposition of the new wing of the school as compared to the original campus building. While seemingly different, the new building implements materials alluding to its predecessor, taking classic prominent features in the original building and modernizing them. For example, instead of using red brick, the new wing uses tan brick. Instead of using cherry wood panels, there is wood slat walls and tan painted metal. In fact, this tactic is comparable to the overall development of this school. From 1886 to 2015 the goal of the school hasn't changed – they take young girls and turn them into successful and independent young women. It's just the girls themselves that have changed, they have become modern women. And so, the main concept for the lighting within the building will do the same, it will embody the classic New England prominent architecture and modernize it.

But the building is not only the sum of its parts, each space has their own identity and personality. It is important to develop a connection between the spaces, while also expressing each individual theme of the room.

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SPACE I // THEATRE



The Performing Arts Theatre is a place of expression and drama and the lighting will appeal to those ideas. It will have a high level of visual interest so that the occupants (students, parents, donors, etc) waiting for the show to begin can take in the drama of the space. A dramatic and modern large scale pendant will hover over the space emitting a soft glow of light. The lighting will also be integral and in-tune with the architecture of the spaces such as the wood slat screen walls which will be supplemented with linear fixtures randomly located in between the slats. This will provide a linear direction to the focal point, the stage. As soon as a performance starts, the lighting must dim down and be presented in a way that will not distract occupants from the stage so the lighting must also be flexible.

SPACE II // WELLNESS LOBBY & CORRIDOR



The Wellness Lobby and Corridor is not only meant for circulation but also for study and collaboration. The lobby will be a space for conversation before sporting events and during the school day. The corridor will have localized areas of privacy with tables and chairs for the students to relax or study during free periods. To emphasize these breakout points, pendant sconces mounted on the columns of the curtain wall will provide additional light onto the task work plane and call attention to these collaborative areas. Furthermore, this space will be very public and will have lighting to reiterate that with uplight onto the ceiling and low level grazing along the upper wall of the interior perimeter of the space. Glare may be a problem in this space, especially in the winter afternoons, with the curtain wall of completely southwest facing glass. Daylighting tactics will be analyzed and reviewed for this space in a later breadth.

SPACE III // DANCE REHEARSAL ROOM



The Dance Rehearsal Room will be a room of dedication and growth. The students will work for hours on their performances and development of the art of dance. The light, like in the great ballrooms of the past, will have some visual interest and glamour, yet also be simplistic in design. Therefore a regular pattern of downlights will produce ambient lighting within the space. The downlights will have an element that hangs just below the ceiling that creates a sparkle of light and a small amount of visual interest. For orientation within the space and to supplement the light coming in from the southwestern glass wall, lighting will graze the front and the back walls of the space. Furthermore, for additional flexibility in the space, recessed track lighting will be applied. This will provide additional control of the performances in the space yet keep a clean and simple design.

SPACE IV // WELLNESS ENTRANCE PLAZA



The Arts and Wellness Entrance is not the main entrances to the building. Most occupants will be entering from the other side of the building, therefore this space is less meant for wayfinding and more for relaxation. Its charm should be evident in its park-like barrier between the building and the sports fields. Landscape architecture in the form of the trees and benches will be highlighted with uplighting and underbench lighting. The charm of sparkling lights like luminaria candles will be modernized into inground miniature marker lights randomly placed into the plaza surface. Additionally, low level landscaping along the plaza's edge will be washed with light to form a perimeter boundary and ambient light will be provided from downlights in the overhanging canopy and from inside the building, transmitted through the glass curtain wall system.

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Schematic Design Presentation Feedback

HELEN DIEMER // THE LIGHTING PRACTICE

Enjoyed lead-in to presentation and outline of concept

Liked the emphasis on connection between spaces, talk more about how the lighting achieved this

Watch wording used during presentation – heavy = ornate, glare = sparkle

Enjoyed the pendant scheme for the Theatre, wasn't so crazy about two or three – walls were busy

LEE WALDRON // GRENALD WALDRON ASSOCIATES

Did not like grazing graphic as illustrated by lines

Wanted to know more about sizing of the wood slats in Theatre

Concept images were excited but the design didn't completely follow through

Images have grand ceilings, theatre ceiling is dark – why?

Could implement a scrim fabric or mesh flat ceiling to create a grand ceiling

Park concept image is glare-y and doesn't translate to marker lights, maybe pick one with luminarias

Point out the fitness room on the plans when talking about Lobby space

Circular lights in the lobby space should be repeated when coming the other way down the hall

How will the ceiling look from the exterior – what if it is repeated on the higher floors?

DR RICHARD MISTRICK // THESIS ADVISOR

Did not like grazing graphics as illustrated by lines – found them confusing

Overhead of Boston map – should the white be the water?

Isn't crazy about the blurred images

Edit CAD PDF images to be simple shapes

Overlaying of lines on the edges was confusing

Stair lighting in Theatre needs to be shown in rendering

Comment on Blackout Screen shading in Theatre during Lutron Presentation

Couldn't tell what hanging pendants were, what they were supposed to be

Add vestibule or entire corridor length into space

Lots of light in the space, is this necessary – consider view from exterior

Dance Rehearsal space – sparkle can be produced by another manner

Show mirror locations in renderings

Think about building entrance – how are people entering the space, multiple views

Show where glass and walkway begin and end

AREAS TO REVISIT // BASED ON FEEDBACK

Theatre

Fine-tune wall elements and design so it will not distract from the performance

Research ceiling potential or be clearer on the reasoning for the dark ceiling

Work through detail of wood slats and wall elements – spacing

Wellness Lobby and Corridor

Adjust lighting considering exterior view – even if it's implemented on second floor

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Consider adding vestibule into scope of Lobby
Explain connect of fitness center in greater detail

Dance Rehearsal Room

Research recessed track fixtures
Research other ways to introduce sparkle into the room – diffuse fixtures may not be the solution

Wellness Entrance Plaza

Revisit concept image – alter to explain concept and design better
Analyze landscape design and how the building will appear from multiple views

Tasks and Tools

SCHEMATIC DESIGN

Hand Sketches, Google SketchUp and Photoshop

3D MODELING, LIGHTING CALCULATIONS, RENDERINGS

3D AutoCAD
AGi32 for lighting calculations and renderings
3Ds Max or Radiance for complex renderings
Photoshop for fine-tuning of renderings

DOCUMENTATION

AutoCAD, Microsoft Word, InDesign and Excel

DAYLIGHTING ANALYSIS

Daysim, AGi32, Radiance

Electrical Depth

The Center for Performing Arts and Wellness utilizes a voltage of 480/277V that feeds from an exterior transformer through the main 3000A switchboard and to various distribution and panel boards. There are also step-down transformers located at panelboards that require a lower 208/120V for receptacles and mechanical equipment. The telecom and security systems are backed up to allow for a secure and reliable system to support the multitude of cameras, help buttons, intercom, door locks and motion detectors. As for materials, the wiring is mostly aluminum and it is important to note that all emergency branches are fed through mineral insulated cable. The emergency system has three branches, two of which feed “standby” and “emergency” branches that supply power to life safety support and mechanical equipment.

The electrical depth of this design will entail a branch circuit redesign for the lighting schemes discussed above, a short circuit analysis for the redesigned spaces and a redesign of the emergency systems for integration and potential cost reduction.

SHORT CIRCUIT

A protective device coordination study will be used to determine a short circuit analysis for one path through the distribution system.

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BRANCH CIRCUIT REDESIGN

Within the four spaces of scope for this design, branch circuits will be redesigned to ensure the accuracy and efficiency of the feeders and panelboards.

EMERGENCY BRANCH REDESIGN

The two branches of emergency distribution, currently labeled “emergency” and “standby” will be analyzed for possible integration. Furthermore, the wiring of the system will be redesigned to possibly increase the savings by limiting the use of mineral insulated cable where it is not required by code.

MAE Depth (AE 565 Focus)

DAYLIGHTING ANALYSIS AND REDESIGN

As discussed previously, the Wellness Lobby and Corridor has a large amount of glare potential within the space. The entire length of the corridor is a glass curtain wall that allows sunlight penetration from the southwest. This could cause large problems especially in the late fall and throughout the winter when low angle sun can throw direct light into this space with potential for thermal gain. While it is a public space, many of the classrooms or fitness centers have glazing as well which the direct light can pass through and potentially heat the space or exhibit visual distress among the occupants. Radiance and DaySimPS will be used to analysis the current conditions and then if necessary, possible passive shading techniques will be evaluated for future implementation. This depth will cover topics discussed in AE 565 (Daylighting).

Acoustical Breadth

By changing the systems and layout in the theatre, the acoustics of the space will also differ. An acoustical study of how this redesign will affect the reverberation time and if necessary, other acoustical options will be implemented and studied as well. Careful consideration will be taken with the amount of fixtures blocking acoustical materials in the space such as filling in the wood slats with fixtures, etc. Background information for this breadth will come from AE 309.

Landscape Architecture Breadth

The plaza outside of the wellness entrance and lobby is a large area of respit outside of the building. It is an open area accessible to both the turf fields and sporting events and the performance spaces within the building. The plaza is meant for relaxation and conversation during events at the school. Therefore, a landscape architecture redesign to follow the flow and architecture of the building and concept will be examined during the spring semester and then implemented in the final design. The final documentation will be in the form of AutoCAD plans and Photoshop renderings. Background information for this breadth will come from Arch 443 (Integrated Collaborative Studio) and further research with collaboration with Landscape Architecture professors.

Proposed Spring Schedule

Please see the following page for proposed Senior Thesis spring schedule.

