



URBN CENTER & URBN CENTER ANNEX

PHILADELPHIA, PA

Lighting/Electrical Proposal

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Option: Lighting/Electrical

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EXECUTIVE SUMMARY

The work to be completed in the spring of 2013 will consist of four lighting depth topics, two electrical depth topics, which will be focused around the four lighting specified spaces, and an architectural breadth in combination with a mechanical breadth.

The electrical depth will consist of developing the lighting designs and using computer programs to analyze, refine, and document the final lighting design. Each space will be redesigned using the comments from this year's Lutron presentations and implementing them into the lighting design. Following this, each space will be virtually constructed in 3D using AutoCAD and then imported into AGI32 to be analyzed. The designs will then be tweaked to meet the desired design criteria.

The electrical depth will consist of a branch circuit redesign and a short circuit analysis upon the specified branch circuits. Beyond the electrical and lighting depth, an architectural and mechanical breadth will be conducted on the URBN Center. The façade of the Annex will be redesigned to articulate the Architect's design intent. The new design will be focused on good daylighting design. The goal of this design is to reduce the lighting load and enhance the overall harmony between the architecture and lighting of the Annex. Furthermore, the mechanical breadth will use a program called, "Green Building Studio," to analyze the change in mechanical loads. There will be a cost/energy comparison between the original design and the new design to delineate whether or not the design is viable.

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BUILDING OVERVIEW

The URBN Center & URBN Center Annex was originally built in the 1970's and designed by the Architects of Venturi, Scott Brown and Associates. The Institute of Scientific Information is undergoing a transformation into a hub for design and media arts on campus. The URBN Center will be the new home for the Antoinette Westphal College of Media Arts & Design. This structure will house the most creative minds on campus including students enrolled in programs consisting of Architecture, Fashion design and Merchandising, Digital Media, Interior Design, and Music Industry to name a few.

An iconic design of Venturi dominates the façade adjacent to Market Street providing the URBN Center with a strong presence to the daily passerby. While the buildings' exterior envelope has been left nearly untouched, besides the introduction of the expanded glazing, the interior spaces have been completely gutted and redesigned. What was a simple layout of classroom and office spaces has been turned into a geometrically complex piece of architecture. All ceilings have been left unfinished giving the interior a industrial impression. Exposed steel, metal panels, plain white partitions, and storefront glazing describe the materials throughout the structure reinforcing the modern and tectonic architecture (within the building). Flexibility and transformation also plays a large roll in the character of this structure. Operable walls that slide and rotate are incorporated into the design, which reinforce the Architects goals for this building.

The Architect's goal for this newly designed space is to bridge the departments together providing the College of Media Arts and Design a facility for collaborative end creative work. As well, to introduce flexible spaces, which help to encourage the interaction between different programs and create spontaneous inspiring opportunities. The final goal for the Architects at Meyer Scherer & Rockcastle was to have as minimal impact on the environment as possible, while keeping costs within the project budget. Strategies for green construction and design were adopted by Green Globe.

Building Statistics

Building name

URBN Center & URBN Center Annex

Location and Site

3501 Market Street
Philadelphia, PA 19104

Building Occupant Name

URBN Center

Size

145,917 ft²

Number of stories above grade | Total levels

4 stories above grade (Roof Level – 56 ft.) | 4 total

Primary Project Team

Owner: Drexel University

<http://www.drexel.edu/>

Architect: Meyer Scherer & Rockcastle Ltd

<http://msrltd.com/>

Venturi, Scott Brown

<http://www.vsba.com/>

and Associates (Existing)

General Contractor: Turner

<http://www.turnerconstruction.com/>

MEP Firm: PHY Inc.

<http://www.phyinc.com/>

Acoustical Design: Walters-Storyk Design Group

<http://www.wsdg.com/>

Structural Engineer: O'Donnel & Naccarto

<http://www.o-n.com/OdonnellNaccaratohome.asp>

Dates of Construction

Start: August 2011 | Finish: September 2008

Actual Cost information

\$31 Million

Project Delivery Method

Design-Build

Zoning

Property Zoning | C-4; 61,913 ft²



DEPTH PROPOSAL | LIGHTING

Overview

The lighting design for the URBN Center will be integrated into the architecture and building systems, while contributing to the goals of Meyer Scherer and Rockcastle. Energy and cost savings will be researched and analyzed to achieve a realistic and applicable design. The incorporations of green building design and sustainability will also take a large role into the lighting design.

Spaces

Circulation Space | *Main Lobby*

Large Work Space | *Fashion Studio*

Outdoor Space | *Annex Exterior Façade and Patio*

Special Purpose Space | *Pearlstein Art Gallery*

Design Concept

The lighting design in each space will strive to reinforce the idea of collaboration and connectivity between the departments who share this facility. Connectivity through the use of transforming spaces has been achieved architecturally with the incorporation of operable walls. The operable walls and complex geometry that shower this structure have played a large role in my inspiration towards my new lighting designs. Furthermore the critiques of my schematic lighting designs, provided by the lighting designers at this year's Lutron presentations, will help me move forward into my design development process leading to the conclusion of my design. Full luminaire and lamp configurations will be specified and described in detail for the final lighting design in the specified spaces. Lighting scenes and control systems will be developed for all four spaces. Through the use of computer programs, ranging from AGI32 to Comfen, my designs will be technically analyzed to achieve the desired design criteria.

Lutron Presentation | Designer Comments

Mike Barber

- Take your time to provide an overview of the space characteristics and orientation
- Build connection between surrounding landscapes of buildings
- Poles are probably excessive to the exterior design
- Tone down sources
- Consider daylighting controls in Studio space
- Develop the integration of exposed ceiling structure
- Too much light in each design
- "clean up, and tone down"

Shawn Good

- Good consistency in graphics

- Don't get hung up on minute details
- Emphasize quote and design concept throughout
- Provide more of a connection between each space
- Consider the appearance of façade lighting on glass
- Think about aiming points and fixture locations in the studio
- Tone down lobby designs
- "less is more"

LOBBY

The Lobby serves the building as the main gateway leading to the main atrium, which delivers the occupants to their desired destinations. This space will receive the highest volume of traffic in comparison with any other space the URBN Center has to offer. The Lobby features a café with its own seating area along the south façade looking out onto Market Street. Operational wall weaved into the design of this space and provide a showcase for the students work. A feeling of compression and expansion is imposed on the occupants as they would move through the vestibule and into the lobby. The lobby not only leads to the four-story tall atrium, but there is also an opening to the second floor. These openings reinforce this idea of connection between departments as well as introduce daylight into the space. Materials in the space include exposed structural steel members, storefront glass, unfinished concrete flooring, decorative metal panels, and plain white partition walls.

The lighting design will reinforce this idea of collaboration and connection. Creating an impression of playfulness is the desired outcome I wish for my design to accomplish. The use of backlit furniture combined with new vibrant color changing LED technology will help to draw attraction to specific areas throughout the space. I will continue to impose the idea of compression and expansion through the use of drop ceilings, circular in shape, with high intensity indirect lighting, and smaller point source lighting on the bottom side, of which will provide pools of light where students can intermingle and collaborate. These lighting 'pods' will draw attention away from the linearity of the exposed structural support system and increase the playful nature I intend to create in the lobby. Providing exterior focal points to the occupant's peripherals will be done with decorative pendent luminaire located at the reception booth and café are. Operable track systems reintroduced from the gallery space will accent the operable walls supporting the idea of flexibility and transforming spaces.

Paying consideration to the comments of the lighting designers I will look to reduce the amount of ambient light and the overdone lighting design. "Less is more," is the quote that summarizes the recommendations from the acclaimed designers. Also I will take opening two second floor into further consideration for my final lighting design. Finally, I plan to reduce the amount of self-illuminating floor boxes in the lounge areas.

For my final design I will orchestrate a set of daylighting control systems of which will seamlessly allow daylight to enhance the collaborative nature of the lobby. Controls systems and lighting schemes will be deigned in full detail.

FASHION STUDIO

The Fashion Design Studio dominates the West side of the third floor of the URBN Center. The studio will primarily be utilized as a large working design studio for students and for class lectures. Fashion shows will also accommodate this space as well. The layout of this space can vary from an open plan to an organized and divided arrangement of spaces. This flexibility is made possible with operable walls. These panels double as art showcases and wall partitions. Large windows located on the North Façade of the studio bring in natural light providing the opportunity for daylight harvesting, while excluding direct sunlight. Glazing continues to wrap around the entire studio offering exterior views to the students regardless of their location within the space, which supports the idea of connectivity between the students and the community. Like most floors throughout the URBN Center, existing polished concrete describes the surface of the floor. The ceiling is left bare exposing all of the plumbing, air ducts, etc. Materials mimic that in most spaces of the URBN Center including storefront glass partitions, cork board in the operable walls, exposed structural steel, and plain white painted gypsum board partitions.

The lighting design in this space will provide uniform ambient light with a luminaire and lamp configuration that will produce high color rendering characteristics. This ambient lighting system will make use of an indirect/direct linear fluorescent lighting fixture laid out in a configuration that can be easily incorporated into the daylight harvesting control system. Pertaining to the flexibility of the space and the use of operable walls a lighting system will be composed of linear fixtures and be positioned in parallel with the operable walls and extended to their length. These fixtures will have a wall wash distribution characteristic in order to accent the operable walls.

As mentioned this space will also be used to hold fashion shows and along with that I developed a flexible lighting scheme that received some good feedback from the Lutron presentations. A truss system will be laid out over head where theatrical lighting fixtures will be used to illuminate and designate a temporary runway within the studio. This lighting aspect will promote the idea of sharing and collaboration through different departments located in the URBN Center. Pairing with this idea I will also incorporate a similar type system with a central focus point where either final critiques or displays could be set up. A truss, circular in shape, would outline this desired focal point and therefore a variety of specific lighting configurations could be set up depending on the subject matter.

Looking into comments received by Shawn Good, I will research runway lighting systems due to the amount of positions that may have been left out in my initial design. Introducing more truss sections allowing for more equipment hanging positions, may need to be evaluated.

As mentioned by the critics I will also dive further into the daylighting controls and aspect specific to this space, due to the high percentage of glazing surrounding the studio. I will develop a shading system to block out unwanted direct sunlight and integrate this with a daylighting system that will make use of photosensors and fluorescent dimming.

ANNEX FAÇADE AND PATIO

This space is primarily used as a transition space from the URBN Center to the URBN Center Annex. Due to the nature of this building, in that it houses a black box theater, an art gallery, and a large screening room, it is sure to attract attention on special event nights. My lighting design will focus on these specific nights and therefore my design will need to draw attention to the main entrance and provide sense of security for the occupants. Furthermore I want reinforce the goal of connection, in particular with the community surrounding this space. Materials and of the façade and patio include three different types of concrete with varying colors, brick, aluminum, clear glass, and glazed aluminum curtain walls.

I intend to design a lighting system for the exterior façade and patio that will attract attention, draw focus the main entrance, provide a sense of security to its attendees, and follow the guidelines of Green Globe. The use of color changing LED strips will slice through the glazed aluminum panels making this façade the center of attention on Filbert Street. A grazing system deployed on to the brick wall will separate the new construction from the old and accenting features such as the raised flower beds and gardens will help to create an environment the promotes human interaction. The few steps located between two raised flower beds will have to be highlighted to secure a safe passage way between the URBN center and the URBN Center Annex.

I will remove the light poles that I have included in my schematic design as recommended by Michael Barber, and use AGI32 to ensure that my vertical illuminance criteria is still being met. Again, it seemed as though I took this schematic design just one step to far and began to draw attention away from my key focal points.

PEARLSTEIN ART GALLERY

The Pearlstein Gallery is located on the East side of the URBN Center Annex's ground floor. The space also exhibits maneuvering architectural features that help keep the art gallery exciting and captivating. Large exposed steel framing and bracing members allow for a floor to ceiling height of 16.5 feet in the west section and in the Far East section of the gallery the roof reaches up to 20 feet. The exposed ceiling and steel framing gives a tectonic and modern feel to the architecture. The front façade incorporates four pivoting walls that open up to a tall vestibule composed of all storefront framing. This aspect allows for indirect daylight to enter the space.

I envision this space as a place for students to hangout and collaborate between classes, while enjoying some casual conversation. I want this space to promote him an interaction and give of a relaxing impression. Special attention will be given to the Flynn studies and then be incorporated into my lighting design. Random pools of light will accent the artwork on display, while providing high contrast. It is common for these spaces to utilize a track system with a grid layout. I plan to incorporate design of the operable walls into my track lighting system. Cantilever pieces of track stemming out from a central point will be subject to rotation. These points of radial track systems will be systematically laid out throughout the gallery to allow for a flexible design that can meet the needs of different gallery exhibits. If the systems works as well as it did in my schematic design I will be able reduce the amount of track being used in this space. I will analyze the cost savings for the implementation of this track system.

The lighting designers at the Lutron presentations specified that for this space that provide alternate figures and images to explain my radial track system. These radial track systems will be modeled in full detail and I will provide a full explanation for this system in my final report. The gallery makes use of skylights located along the north end of this space. I plan to analyze the functionality of the proposed skylights and then I plan to redesign these skylights to see if I cannot enhance the functionality.

Tasks and Tools

Schematic Lighting Design

Lighting design will be finalized in reference to the comments provided by the critics at the Lutron presentations. Therefore, lighting designs will be toned down, cleaned up and focus more on connection between space in combination with adhering to the overall design goals.

Modeling & Analysis

All spaces will be simplified and modeled in 3D AutoCAD and then analyzed in AGI32. AGI32 will be used to ensure that the lighting designs meet all desired lighting criteria as specified by the Lighting Handbook 10th Edition. Additionally, AGI32 will also be used to evaluate the special power densities of each space and make sure that they coincide with the current ASHRAE 90.1 standards. I will then use DAYSIM to analyze the daylighting characteristics in all spaces. For the studio I will also analyze the cost savings of daylight harvesting using a photosensor, dimming, and shading systems.

Design Development

Luminaire lamp configurations and control systems will be fully developed and designed. Lighting scenes will be defined and accounted for in applicable spaces.

Design Documentation

All lighting and control equipment will be documented.

Final Renderings

Using the models created and provided I will create renderings using lighting software including AGI32/3D Studio Max.

DEPTH PROPOSAL | ELECTRICAL

Overview

The URBN Center makes use of a radial electrical system. A single 13.2 kV service located in the main electrical room provide power to the URBN Center. This service is then split and delivered to three different medium voltage service switchboards all located in the main electrical room on the North side of the first floor. Two step the voltage down to a 480Y/277V systems, with one supplying power to the mechanical, lighting equipment and the other supplies power the fire pump. The other medium voltage service switchboard provides power to the receptacles.

Branch Circuit Distribution

After a new design has been completed for the four specified spaces a new branch circuit distribution will have to be designed to accommodate to the added or reduced loads.

Short Circuit Analysis

A short circuit analysis will be conducted between the medium voltage switchgear ,supplying the lighting circuit panels pertaining to the redesigned lighting systems.

DEPTH PROPOSAL | ARCHITECTURAL

The façade of the current URBN Center Annex makes us of a glazed aluminum curtain wall and a storefront glazing façade, which is built around the existing brick on CMU structure. I intend to redesign the façade along with the patio to reinforce the goal of connecting the general community with the students of this facility. The design will incorporate daylight control systems near the main lobby, helping to reduce to electrical lighting load during the day. I will continue to use similar techniques as seen throughout the architecture of the URBN Center.

DEPTH PROPOSAL | MECHANICAL

With the redesign of the façade I anticipate the mechanical loads to increase. An analysis of the lighting load within the lobby space will be conducted to see if the energy and cost savings can make up for this increase in mechanical load. A Revit model will be created and then be analyzed using Green Building Studio.

Spring Semester Thesis Schedule

Milestone 1		Milestone 2		Milestone 3		Milestone 4											
1/28/2013	Jan 21/13	2/11/2013	Feb 11/13	3/1/2013	Mar 4/13	3/25/2013	Mar 25/13	Apr 1/13	Apr 8/13								
Finalize lighting designs	Jan 14/13	Feb 4/13	Feb 18/13	Feb 25/13	Mar 4/13	Mar 18/13	Mar 25/13	Apr 1/13	Apr 8/13	Apr 15/13	Apr 22/12	Apr 29/13					
Modeling (3D AutoCAD)	Lighting renderings	Calculate lengths of branch circuit runs	Perform short circuit analysis	Spring Break	Final Lighting Renderings	Branch circuit redesign	Conduct energy analysis	Organize and format final Report	Construct final pres.	Final Report 4/3/2013			Final Presentation 4/8-12/2013		Senior Banquet 4/26/2013		
Research facade design	Redesign Annex facade	Lighting Depth	Electrical Depth	Architectural Breadth	Mechanical Breadth												