

South Nassau Communities Hospital North Addition

Oceanside, New York



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Lighting Electrical
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Executive Summary

The following report outlines work to be completed during the Spring 2011 semester for AE 482. The thesis requirements are to complete two depth subjects and two breadth subjects. An additional subject will be studied to fulfill MAE requirements.

The first depth subject will be a complete lighting design of the four spaces studied during the Fall 2010 semester. To meet the electrical requirements of the Lighting Electrical option, the second depth subject will involve two in-depth electrical studies, as well as electrical design based on the new lighting design. The two breadth topics to be studied include an architecture / landscape architecture study and redesign of the existing courtyard and a mechanical study involving the design of a new air diffusers in the main lobby. To satisfy the requirements of the MAE program, research on the effects of lighting on circadian rhythms with respect to night shift nurses will be conducted and applied to the lighting design of the nurses station.

Table of Contents#

- #
- Executive Summary 2**
- Building Statistics..... 4**
- Depth Proposal - Lighting 5**
 - Overview 5
 - Overall Design Criteria and Considerations 5
 - Lighting Design – Main Lobby 5
 - Lighting Design – Auditorium..... 6
 - Lighting Design – Courtyard..... 6
 - Lighting Design – Nurses Station..... 7
 - Professional’s Comments from Lutron Presentations 7
- Depth Proposal - Electrical 8**
 - Overview 8
 - Four Spaces for Lighting Redesign 8
 - Main Lobby (Main entrance to the building located on the Ground Floor) 8
 - Auditorium (Adjacent to the main lobby located on the Ground Floor) 8
 - Courtyard (Adjacent to the conservatory located on the Ground Floor) 8
 - Nurses Station (Second floor, West wing) 9
 - Short Circuit Analysis 9
 - Depth Topic #1 – Motor Control Center 9
 - Depth Topic #2 – Compare Energy Savings vs. First Costs for Inc. Feeder Sizes 9
- Breadth Proposal #1 - Architectural 9**
- Breadth Proposal #2 - Mechanical..... 9**
- MAE Focus 10**

Building Statistics

Summary

Completed in May 2005, the North Addition of the South Nassau Communities Hospital provides an additional 108 medical / surgical beds, LDRs (Labor/Delivery/Recovery), an obstetrical suite, a behavioral health unit, offices, and a 300 seat auditorium to the existing complex. Designed to accentuate the strengths of the existing historical building, the North Addition serves as a welcoming entrance and helps to create a modern image for the hospital.

Building Name | South Nassau Communities Hospital North Addition

Location | Oceanside, New York

Building Occupant | South Nassau Communities Hospital

Occupancy Type | Institutional (Group I-2), Assembly (Group A-3)

Size | 160,000 SF

Stories | 5 (all above grade)

Project Team

Owner | South Nassau Communities Hospital

Architect | Cannon Design

Engineers | Cannon Design

Communications Consultant |

Civil Engineer |

Construction Manager | Bovis Lend Lease

General Contractor | KLMK Group

Dates of Construction | December 2003 – May 2005

Cost | \$64,100,000

Project Delivery Method: Guaranteed Maximum Price

Depth Proposal - Lighting

Overview

The lighting depth to be completed for the Spring 2011 semester includes the lighting redesign of four spaces; a circulation space (the main lobby), a multipurpose space (the auditorium), an outdoor space (the courtyard), and a large workspace (the second floor nurses station). For each space, the lighting equipment and controls will be design and specified to the level of construction documents. Initial schematic designs for these spaces were completed for Technical Report 3 during the Fall 2010 and semester and were presented to a panel of professionals on December 8th, 2010. Their comments are included within this proposal and will be used to improve the final design. Computer software such as AGI32, AutoCAD, and 3D StudioMax will be used for calculations and renderings of the new lighting designs.

Overall Design Criteria and Considerations

Each space outlined above will be tailored and designed based on specific design criteria and considerations for each space, however several overall concepts will be employed through all of the spaces. The main goal of both the owner and architect is to create a state of the art medical facility that will provide quality patient care within the community. The lighting design for each space should express this modern statement, and should make visitors and patients feel comfortable and relaxed. They should trust that South Nassau Communities Hospital is the best source of quality healthcare, and the overall lighting design can help give this impression. Additionally, each space should meet or exceed illuminance recommendations and power requirements.

Lighting Design – Main Lobby

Upon entering the lobby, occupants are greeted by the reception desk located to their left. The lobby serves as a transition and circulation space between the elevator lobby, conservatory, and auditorium. Lined by a frosted glass railing, the walkway on the second floor overlooks the double storied space. A small seating area placed around large support columns provides a relaxing space to wait. A corridor leads from the main lobby to a smaller entrance lobby near the auditorium. Natural materials such as stone and wood decorate the walls, and the outside of the auditorium is an important architectural feature in the space. Due to the large number of social interactions that occur in the space, the lighting should provide good facial rendering.

The proposed lighting design will aim to create a commanding first impression of the hospital. Occupants should feel that they are in a facility that will give them the best possible healthcare. Slot lighting will be used to illuminate the walls in the lobby to create an impression of spaciousness as well as assist in creating a relaxing environment. Higher illuminance levels will be used to draw attention to important areas such as the reception desk and elevator lobby. Lighting will also be used to highlight key architectural elements within the space, such as the structural columns and

auditorium wall. Cove lighting will be used in the ceiling to help define the space as well as add to the impression of spaciousness.

Lighting Design – Auditorium

The auditorium is located adjacent to the main lobby on the ground floor. Designed to function as an auditorium as well as a small conference center, the space can be divided into three separate rooms and can be used for public functions as well as to host more formal events. The main projector screen is located on the front wall of the auditorium. Visual tasks will vary depending on the function of the space. As a conference center, visual tasks will likely include reading and writing, but could also include viewing presentations. Minimizing glare and producing good facial rendering on the speaker will be important to consider when designing the lighting for a presentation space. The auditorium is roughly in the shape of an ellipse with the wall serving as an interesting architectural element in the space.

The proposed lighting design will aim to create a flexible environment that can be used for a wide range of low key and public functions. Flynn impressions will be studied and used to create a space that can feel both intimate and public depending on the function of the space. Lighting will be added in the form of a slot or cove to help define the ceiling and create contrast between the ceiling and walls. Luminaires will be incorporated into the wall to help highlight the unique shape of the space.

Lighting Design – Courtyard

The courtyard serves as an extension of the conservatory and functions primarily as a circulation space that connects the conservatory to the older sections of the hospital. A small seating area sits just outside the entrance to the conservatory. Visual tasks in the space are primarily related to circulation, so the lighting design should facilitate safe and easy movement through the courtyard. The surrounding exterior walls of the hospital are brick with some brushed stainless steel panels. The shell of the conservatory is composed of clear laminated glass. The ground of the courtyard is concrete with surrounding planters covered with grass. This space will be redesigned as a part of the architecture / landscape architecture breadth study.

The goal of the courtyard will be to create an extension of the existing conservatory. Combined with the architecture, the proposed lighting design will aim to create a pleasant environment where occupants can relax. Lighting will be used to illuminate the main pathways as well as architectural elements within the space. Uplighting will be used to accent existing and / or added landscaping such as trees. Lighting will also be used to give the courtyard boundaries, and will help to make the space feel more secure.

Lighting Design – Nurses Station

Located throughout the hospital, the nurse's stations are the center of activity for the surrounding area. The stations serve as a central monitoring location for nurses as well as an area for doctors and nurses to communicate and organize patient information. Visitors and patients also use the nurse's stations to request information. The nurse's station to be studied in this report is located in the West wing of the second floor. Two corridors surround the station, which is positioned in the center of the surrounding patient rooms. Custom workstations provide areas for computer usage in addition to drawer and file space.

The proposed lighting design's main goal will be to create a good work environment. It is important that illuminance level be adequate for the necessary tasks performed in the space. Since the space is located between two hallways, and is rather small, lighting will be used to create an impression of spaciousness in the space. Slot mounted luminaires will illuminate the walls and will help create a spacious and relaxing environment. Cove lighting will also be used to help define the space and add to the feeling of spaciousness. Additional downlights and task lighting will be used to help attain the required illuminance values.

Professional's Comments from Lutron Presentations

Lee Brandt

- Good presentation.
- Second concept for lobby reinforced architecture the best.
- Study a model of the auditorium. When lighting the walls, some light will spill onto ceiling.
- Cove, wall, and down lighting in the nurse's station will make it difficult to meet power codes. Consider low wattage LED strips for cove lighting.
- Consider research of circadian rhythm. Sometimes brighter light is preferred in the nurses station.
- Good to light edges in the courtyard

Michael Barber

- Good presentation.
- Presentation of two views is a little disorienting.
- Consider studying the auditorium wall and its changes in angles. Maybe try something without a fixture in the material, such as lighting the wall from the ceiling.
- Keep views and plans consistent when presenting.
- Multiple sources in the nurses station will make it difficult to meet energy requirements.
- Dim light in nurses station may be better, but do addition research on light levels and possibly color.

Luke Tigue

- Lobby concepts are good, try to use one view. Use original design considerations to help make decision between scenarios.
- Curved wall in auditorium will present a challenge. Also consider how the room will be divided. If dividers are used, eliminate chaos.
- In the courtyard, consider what is seen from the conservatory. Consider vertical brightness so that the courtyard can be seen through the glass at night.
- Agrees with centering something over nurses station to define the space, but consider energy budget

Depth Proposal - Electrical

Overview

The scope of the electrical portion of the senior thesis includes a redesign of branch circuits where new lighting loads will be applied, a short circuit analysis and protective device coordinations, and two depth topics. The two depth topics that will be analyzed will be a

Four Spaces for Lighting Redesign

Main Lobby (Main entrance to the building located on the Ground Floor)

The lobby serves as a transition and circulation space between the elevator lobby, conservatory, and auditorium. The primary existing lighting in this space is T5HO linear fluorescents. Metal halide sources are used in some areas to accentuate the architecture. Compact fluorescent fixtures are also used throughout the space for cove lighting. The proposed lighting design will eliminate the linear fluorescent downlights and will replace them primarily with cove lighting above the main circulation area. Metal halide downlights will likely be needed to achieve recommended illuminance levels. Linear fluorescent or LED fixtures will also be used in slot lighting applications along the walls.

Auditorium (Adjacent to the main lobby located on the Ground Floor)

The auditorium can serve as an auditorium or conference center, and can be divided into three separate spaces. The primary existing lighting in this space is T5HO linear fluorescents and incandescent downlights. The new lighting system will consist of perimeter lighting, and will use LED or compact fluorescent fixtures for downlighting. Incandescent sources may be used if power requirements are met. This space must be flexible and the lighting equipment must be dimmable. The proposed lighting loads will be of lower energy consumption.

Courtyard (Adjacent to the conservatory located on the Ground Floor)

The courtyard will serve as an extension of the conservatory. Currently, the existing lighting in the space consists only of metal halide downlights under the overhang adjacent to the offices facing the courtyard. The new lighting design will incorporate landscaping lighting for trees as well as some inground lighting to highlight the architecture in the space. LED or metal halide sources will likely be used in this space. The proposed lighting loads will be of higher energy consumption.

Nurses Station (Second floor, West wing)

The nurses station is located on the second floor of the hospital and serves as the hub of activity in that area. The existing lighting in the space includes indirect fluorescent fixtures and some decorative lighting. The new lighting design will incorporate peripheral lighting as well as cove lighting. Downlights will be used to achieve recommended illuminance levels. LEDs and / or fluorescent lighting will primarily be used for this space. The proposed lighting loads will be of lower energy consumption.

Short Circuit Analysis

I will be conducting a protective device coordination study that will address a single-path through the distribution system. The path extends from the utility entrance to the main switchboard to panel 4LNL1. This path includes the distribution panel 3PNL1 and step-down transformer 3-T01. The coordination of protective devices will be shown along this path. The feeders along this run are numbers 12 and 35.

Depth Topic #1 – Motor Control Center

Currently, the motor controls are spread out through various mechanical rooms in the hospital. To consolidate the equipment, a motor control center will be designed. The loads for a mechanical room in the space will be analyzed. Based on this analysis, a mechanical equipment motor control center and associated feeder will be designed. A motor control center schedule and isometric view created in AutoCAD will also be provided. Feeders will be sized according to NEC 2008 standards.

Depth Topic #2 – Compare Energy Savings vs. First Costs for Inc. Feeder Sizes

Feeders that are appropriately sized generally give off wasted energy in the form of heat, which could be saved by increasing the feeder size. Calculations will be performed to determine the amount of energy lost. This will then be compared to the cost difference between the increased feeder sizes and the design sizes. The cost analysis will be presented in the form of spreadsheets and graphs.

Breadth Proposal #1 - Architectural

The architectural breadth will consist of a redesign of the existing courtyard space. Currently, the space contains minimal landscaping with little architectural interest. The new courtyard will be designed to serve as more of an extension of the existing conservatory. Landscaping will be designed to add visual interest. The main design goal for this space is to create a pleasant environment that can be used as a space to relax as well as create a visual backdrop for the adjacent conservatory.

Breadth Proposal #2 - Mechanical

The current air diffusers in the main lobby create hard linear lines that take away from the original vision of the space. This breadth will involve the sizing, selection, and layout of new diffusers that

will help to eliminate visual clutter on the ceiling and will allow the lighting design to build upon the original vision for the space.

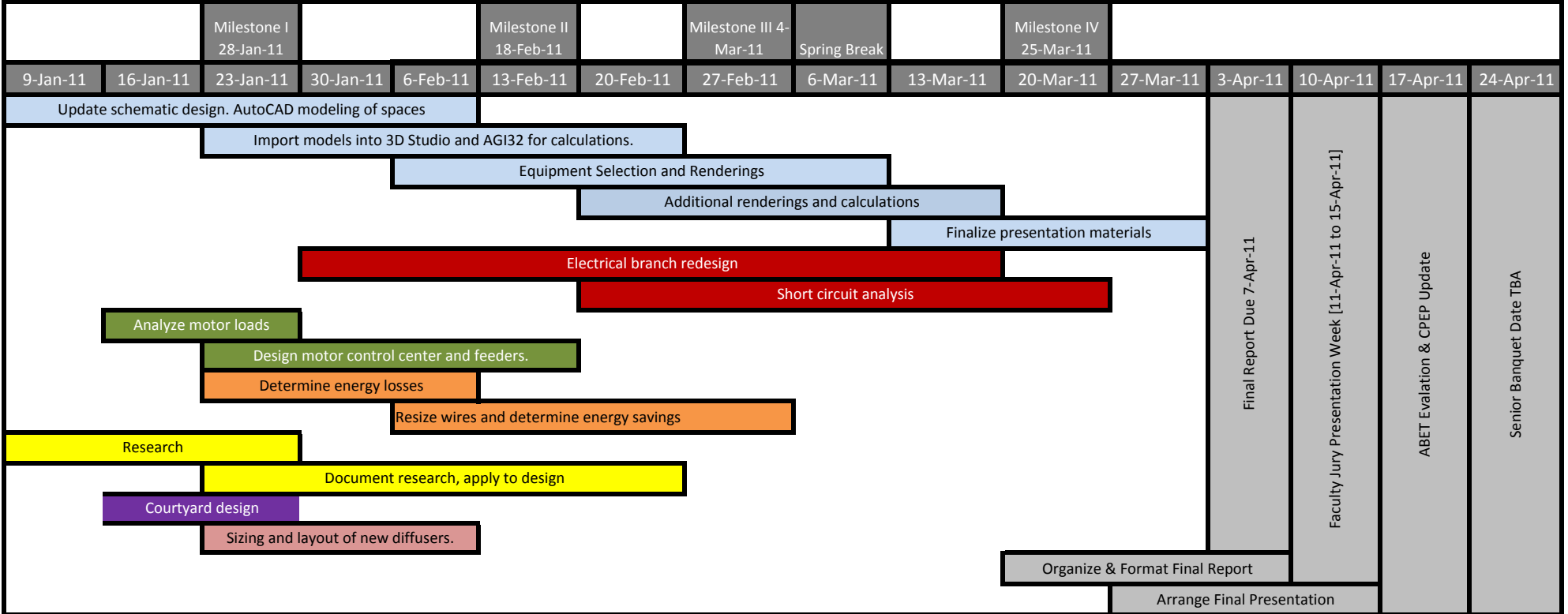
MAE Focus

The MAE course to be implemented into the senior thesis will be AE561 which involves the study of light sources. Material from this course will be used in such a way as to determine the biological effects that different light sources or designs have on occupants in a space. This research will be focused on the effects of lighting on people who work night shifts, and will be applied to the lighting design of the nurses station.

Proposed Thesis Schedule
January 2011 - April 2011
Submitted: Jan. 14, 2011

South Nassau Communities Hospital North Addition
Oceanside, NY

Carl Speroff
 Lighting/Electrical Option
 Consultant: Dr. Kevin Houser



Milestones	
I	Courtyard Design, Initial research for MAE study
II	1 Space substantially complete (lighting & elec), Elec depth 1 95%
III	2 Spaces substantially complete (lighting & elec), Elec depth 2 95%
IV	Lighting Electrical Depth complete

Color Code Key	
Lighting Depth (4 Spaces)	[Light Blue]
Electrical Required (Branch Circuit Redesign / Short Circuit)	[Red]
Electrical Depth 1 (Motor Control Center)	[Green]
Electrical Depth 2 (Increasing Feeder Size)	[Orange]
MAE Depth (Research for Nurses Station Lighting)	[Yellow]
Breadth Topic 1 (Architectural Courtyard Design)	[Purple]
Breadth Topic 2 (Lobby Diffuser Redesign)	[Pink]