Depth Work Proposal

Building Introduction:

The Center for Health Research and Rural Advocacy (CHRRA) is a 63,000 sq ft building located on the Geisinger Health System Campus in Danville, Pa. The curvilinear structure has three levels above grade (1 below grade) and is slated to become LEED silver upon completion. Construction on CHRRA began in May 2005 and is scheduled to be completed in February 2007. CHRRA serves as the Geisinger research center for common health issues that occur with age. This building is the gateway between the hospital and the community of Danville.

Lighting:

For the spring 2007 semester I will be analyzing and redesigning the lighting systems for the following five building spaces: the main lobby; the auditorium; the first floor open office; and the exterior circulation spaces including the main entrance, the pedestrian pathway, and the south side terrace. CHRRA is the mainframe of knowledge for Geisinger, the data center of new ideas, and the information highway of medical improvements. The lighting for the building should reflect the precise, sleek, and fast pace technical advances of the employees of CHRRA.

Main Lobby:

The main lobby is the first place a visitor to the building will experience. There is a curved glass, double height curtain wall on the North façade of the space which creates the opportunity for natural daylight to enter the building. A metal open staircase follows the curved façade up to the second floor of the main lobby

The design goals for the main entrance lobby are to create and interesting space that will be visually pleasing from both the interior and exterior, balance the natural and electric light, and create a comfortable transition from the exterior to the interior. The double height area of the main lobby is solely for circulation; however, the break out space surrounding the lobby has moveable tables and chairs where reading and writing will take place. The main stairs and two elevators are also located in this space.

I plan to redesign the space with a combination of pendant and recessed lighting systems that will transform the lobby into a glowing beacon from the exterior. Programs such as Autocad, AGI32 and Lightscape will be used for modeling, rendering and calculations. A daylight study will be coordinated using AGI32 or Lightscape to determine the natural light present in the space and to analyze the possible need for photosensor dimming.

Auditorium:

The auditorium along with the main lobby are the two most visitor trafficked spaces in CHRRA. It is important that this unique 300 seat auditorium be aesthetically pleasing and create a memorable experience for the occupants. The space is ellipsoidal in shape and has a front projection screen along with speaker podium at the bottom of the space. The seating is set up stadium-style so that the stage is visible from all areas.

The design goals for this space are the implement a flexible lighting system with multiple control zones in order to create appropriate lighting scenes for presentations, lectures, and discussions; minimize direct glare while also providing adequate vertical illuminance for facial modeling; and to create and atmosphere that will enhance group discussion.

I plan to redesign this space with a combination of perimeter accent lighting, key lights for the speaker, recessed down lighting for the front and back areas, and recessed slot moveable fixtures for over the audience seating. Programs such as Autocad, AGI32, and Lightscape will be used for modeling, rendering, and calculations. Lutron Electronics will be consulted for lighting control systems and wiring.

First Floor Open Office:

The open office is an area of the building solely for the employees. The researchers and their staff will be using the open offices (one on the first floor and one on the second) for their day to day needs. It is important that the space reflect these specific needs.

The open office has a large, curved, glass curtain wall façade on the south-west side which provided a great deal of natural light to the space. Currently, there is a circulation space directly adjacent to the glass, which has tall partitions will filing cabinet storage. Behind this area, moving away from the glass, are the partial height cubicles, followed by another smaller circulation space that separate the open office from the private offices.

The design goals for this space include: avoiding glare and veiling reflections due to intensive VDT use, create a system that will allow for daylight harvesting, choose a lighting system that will avoid creating shadows due to partition and cubicle walls, and incorporate an option for task lighting.

I propose changing the architectural layout as part of my lighting design for this space. The high partitions around the filing cabinets block all visible views for the occupants of the cubicles. The walls also block a great deal of daylight from entering the cubicle area which could potentially create a great deal of energy savings. As part of my redesign, I would like to address moving the smaller circulation space adjacent to the glass, moving the cubicles closer to the curtain wall while creating better views, and move the filing storage area between the open and private offices. The lighting system

will reflect this change, by having pendant direct/indirect fixtures aligned parallel to the curtain wall that will provide light for the cubicle areas. The filing storage will use recessed fixtures due to the lower ceiling height.

A detailed analysis of the daylight must be conducted for this space in order to determine dimming zones for the pendants, the need for automated motorized shades, and the possible energy savings that will result from the increase of daylight harvesting.

This portion of the lighting depth will take a great deal of time and effort. AGI32 and Lightscape will be used to do a daylight study, SPOT will be used for photosensor placement along with critical point calculations, and Lutron Electronics will be consulted for programming the fixtures, photosensors, and motorized shades in the space.

Exterior Areas:

The exterior of CHRRA is very unique for this campus in that it is the only curved glass façade. It is important to highlight this façade without creating a great deal of light pollution. The main entrance leads directly into the main lobby which will be lit as a glowing beacon drawing visitors toward the building. The pathways leading up to the building come off the main drive to the hospital. The employee terrace is located on the south side of the building and will most likely not be used very often at night so minimal lighting is necessary.

The design goals considered for the exterior are: minimizing glare off the glass into the eyes of pedestrians or drivers, centralize the focus on the main lobby, provide adequate illuminance levels for the pathway, and minimize light pollution.

I propose lighting the vertical surface leading to the main entrance with a recessed blue LED fixture that will mimic the cove in the main lobby while also accentuating the curved exterior surface. The pathway will be lit with low bollards to avoid drawing attention away from the glowing main lobby. The terrace will be lit with cut off pole fixtures providing minimal light levels.

The exterior lighting redesign will require using AGI32 and Lightscape for calculations.

All of the proposed lighting designs reflect the comments from the Lutron presentations on December 15, 2006. The presentation was very helpful and allowed for additional advice and guidance on the proposed lighting concepts.

Electrical:

The electrical depth for the spring semester includes a partial redesign of the power distribution system for CHRRA. The electrical work for the five lighting redesign spaces will include: revised panelboard schedules, re-circuiting, load calculations, resize

the panelboards if necessary; resize the feeders for the new panelboards, and layout branch circuits and controls.

I have also proposed changing the voltage of the lighting in the entire building from 120V to 277V. This will allow for more luminaires on a circuit and will create the need for fewer runs of wiring and conduit. The change will also create a need for fewer panelboards, relay panels, and dimming panels. A cost analysis of the savings due to equipment and installation will be conducted in order to compare the existing and proposed electrical solution.

I also propose changing all the lighting in the building to high efficient lamp sources. The building is currently designed using only T8 lamps for the linear fluorescent sources. Switching to a T5HO lamp will allow for fewer fixtures and will therefore increase savings. I will look at all the spaces in the building using linear fluorescent sources and use AGI32 to perform illuminance calculations in order to determine the number of fixtures needed to obtain the same average illuminance in the room using T5HO lamps. I will then do a cost analysis using lamps, fixtures, and installation costs to determine the savings from the proposed electrical redesign.