

Technical Report IVb: Proposal

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s. good | the nerman museum

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Executive Summary:

In this report, a proposal of work to be complete and turned over during the spring 2014 semester will be outlined. This report is part of the Architectural Engineering senior thesis CPEP. It consists of redesigned lighting schemes for five spaces, an electrical depth, and two architectural engineering breadths – architectural and acoustical. Daylighting will also be an area of study.

The five spaces to be redesigned are:

1. Ground/Exterior
2. Solarium
3. Café
4. Auditorium
5. Gallery

The overall concept for the lighting design will stem from the architecture in three ways laid out in the report:

1. Experiential architecture becomes art
2. Refined minimal architecture brings sophistication and order
3. Connection to nature creates space and comfort

The electrical depth includes a short circuit analysis, a branch circuit redesign, and a voltage comparison for the new lighting schemes.

The architectural breadth involves redesigning the ceiling in the auditorium while the acoustical breadth deals with the new parameters of the redesigned ceiling and how it affects the room aurally.

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Building Overview:

Location Building name

The Nerman Museum of Contemporary Art

Location and site

Johnson County Community College

Overland Park, KS

Building Occupant Name

The Nerman Museum

Occupancy or function types

Education | Art Gallery | Café

Size

38,190 SF

Number of stories above grade / total levels

2 stories above grade | 2 total

Dates of construction

Start: April 2005

Completion: August 2007

Actual cost information

Approx. \$15 million

Details not released

Project delivery method

Design Bid Build

Lighting Depth:

The lighting depth will focus on five spaces of the Nerman Museum of Contemporary Art: The grounds/exterior, the solarium, the café, the auditorium, and a gallery space.

Concept

The main themes and overall concept for the proposed lighting design will largely stem from the architecture of the building.

Experiential

The Nerman Museum is more than just a repository for art. Because of its minimal and modern style, it is able to stand out from the other campus buildings in the surrounding area. The building is meant to be a piece of art as much as the art it houses inside. The architecture becomes art.

Refined minimalism

And that architecture is in a refined minimalist style. It is not just minimal for economic reasons but to create a sense of leanness and sophistication. Subdued colors, a sophisticated level of finish, and a highly controlled and well-organized structure create a feeling of order and simplicity. This style of architecture forces the perspective not into the space, but out into the landscape, enhancing the feeling of space within the building.

Connection to nature

By turning outward, the patrons are able to connect to the surroundings. This connection to the outside is a driving force behind the architecture. It's strengths lie in creating a feeling of calm, ease, and soothing nature.

It is the designer's goal for each theme in this concept to be reinforced and enhanced by the proposed lighting design.

Space I: Grounds

Using the architectural forms of the building -in particular the lone window located in the cantilever part of the building- lower level walk way lighting will be used to lead patrons into the building. Using sensor controls, lighting will grow brighter as the patron walks through the space creating directionality and a fun response to its environment. Soft up-lighting to the façade of the white limestone will be in contrast with the brighter lit windows glowing from within. This makes the building form become an abstraction and blend into the campus landscape.

Space II: Solarium

The solarium needs to be spacious, create some visual interest and be mindful of the glare since three sides of the space are glazing. To create some visual connection as well as visual interest, daylight will be used by passing through a solar control screen with perforations placed outside the glass. The daylight will transform and be realized on the stone wall of the Nerman Museum. This pattern of daylight dots will mimic the LED board located in the cantilever part of the building outside. This connection creates a consistent look for the entrances of the museum. During the night, simple profile pedestrian style light poles will provide lighting for the seating area. Up-lighting the perforated screen at night will create a 'LED-board-like' element to the ceiling of the solarium creating spaciousness and visual interest.

Space III: Café

By using the forms of the windows and continuing the light onto the ceiling by use of backlit panels, the seating area of the café become wrapped in glowing regular forms. This creates intimacy and a private lighting mode. Dramatic internally lit forms project around the server producing a lighting language to draw you in. Keeping the architectural features of the space clean upholds a minimal approach.

Space IV: Auditorium

Daylight integration and creating a connection to the outside will help shape the ceiling in this space. Using clean lines and a radial fan pattern, the ceiling slopes up and then back down to create space in the room. A series of skylights located above the drop ceiling provide daylighting from above. Full blackout shades will be used for AV schemes. The panels softly diffuse the daylight down into the space and help create a general brightness to keep students awake. Downlights located in the slots between the panels provide the bulk of the ambient task lighting. These downlights will be located just above the ceiling plane, forming the look of a clean and uninterrupted ceiling. The wooden walls located on the back and front walls will be grazed to highlight the natural textures and provide depth. Track-lighting near the front will help produce center room focus.

Space V: Gallery

Focusing on the gradient of a sky, stretched fabric will be used in a rectangular shape on the ceiling. The transparent fabric will be edge lit creating a soft gradient to the fabric which will provide the ambient light in the space. Track will be attached to the stretch fabric form and throughout the room to provide a flexible scheme for the track fixtures to be located. The track fixtures will provide the lighting for the artwork. Contrast between the window, wall, artwork, and fabric ceiling will have to be properly balanced with the focus on the artwork.

Schematic Design Presentation Feedback:

Lee Brandt

Up-lighting for the façade: think about alternative solutions - angles of glare

Didn't fully understand forest scheme in solarium

Need section to fully understand solarium and schemes

Liked pedestrian poles in solarium space for seating area

Like presentation graphics

Written quote from evaluation sheet: "Very creative and thought provoking alternative solutions that appear workable. Interesting conceptual presentation technique that showed a good style sense for design. Would like to see how the approaches get realized."

Lee Waldron

Present who the client is at beginning

Liked presentation format

Creative and interesting technique

Liked sketch ideas

Need titles for new areas while moving around the building in presentation

Consider using proposed path lights with sensors to draw you into the building

Did not understand mountain scheme in solarium - needed more clarification

How does the track and the fabric details work in gallery space

Consider how space above ceiling panels will look in auditorium

Shawn Good

Grounds photo wasn't consistent and didn't show LED board enough

How does lighting scheme work with LED board since that will be focal point

Need to practice presentation and present with more confidence

Limit saying "uh" and "um"

Atrium was not related back to the feelings of the space

Used term “harsh fluorescents”: why are fluorescents harsh?

In café, never tied scheme back to design criteria

Skipped over fixtures very quickly

Use “luminance” when talking about auditorium ceiling panels – shows credibility

Spoke to screen a lot during presentation – should know presentation better

Concepts for café and gallery were improved since last presentation

Areas to revisit

|Based on feedback and own thought

grounds

Need more consistent way to bring up LED art installation that won't hinder flow during presentation

Look at creating directionality with the marker lights growing bright to the path ahead of you

Will consider looking at other ways to softly uplight the façade other than in-grade fixtures

solarium

Need to be clearer on these schemes when presenting

Will look at combining some schemes – night and day

café

Will consider using the lit glass partition or not

I foresee problems creating a dramatic, private scheme so it will need further attention

auditorium

Need to further develop daylighting techniques and solutions for lit ceiling effect

Will consider space behind ceiling panels and how it will look to the users at ground level

gallery

Details of track and fabric interaction need to be addressed

Angles for grazing of fabric need to be studied to achieve desired effect

Contrast study of wall, art, window, and lit fabric need to be weighed

presentation

Greatly need to practice presentation more to lessen nerves and build confidence

Clarity and articulation of ideas need to be improved

Limit filler words

Create a rhythm and flow to presentation

Keep conversational tone

Tasks + Tools:

Schematic

Pencil & pen sketches, Photoshop

Design Development

Pencil & pen sketches, Photoshop

3d Modeling

Rhino, 3d CAD

Lighting Analysis

AGI32

Daylighting Analysis & Controls

Daysim, Diva – Rhino plugin, AGI32

Final Renderings

Photoshop, Revit, 3dsMax – Still considering all options

Electrical Depth:

The electrical depth will consist of a branch circuit redesign consistent with proposed lighting schemes, a short circuit analysis of new circuit design, and a voltage comparison for the lighting.

Johnson County Community College provides power for the entire college and the Nerman Museum is included. The college also owns all the electrical equipment for the museum. The power enters the building at an outside transformer and is then taken into the building to the main first floor electrical room. There, it feeds into the main switchboard rated at 1600A, 480/277V, 3P, 4W. Branch circuits for the lighting are then used at 277V or 120V as needed for lighting equipment. A offsite generator is used through an automatic transfer switch that provide emergency life safety tasks.

Branch circuit design

A new brand circuit will be redesign for the new proposed lighting schemes in the solarium, café, auditorium, gallery, and grounds. Panels, feeders, and branch wiring will be resized as needed to adapt to the new lighting system.

Short circuit analysis

Protection for the new branch circuit will be an area of study. This will concern a single path through the electrical system. The study will consist of an analysis of the lighting panel board through the main service feeder.

Wind power electricity generation

Using the kinetic energy of the rotating disks in the solarium, electricity can be generated. Using small induction motors linked to each solar protection disk, at 6 watts per motor, it's feasible to think it can contribute a small portion of the electricity used in the museum. This system will also be monitored to a display in the solarium so that visitors can see how the wind is powering these spinning disks.

Breadth I: Structural:

The lighting scheme in this space is directly tied to the redesign of the ceiling in the Auditorium. Daylighting is also directly used in the design of the new ceiling. A radial fan pattern ceiling, with open slots between will be realized for the space. Modeling in Rhino and 3d CAD will be used to further investigate the room geometry. Overall, the ceiling must match the themes and concept of the architecture and fit in the modern minimalist style it now has.

The Structural breadth includes resizing and relocated the supports above the ceiling of the auditorium to make room for and support the skylights needed to realize the lighting scheme. The roof structure currently consists of series of joists spanning the large open space and tied into the concrete columns. A galvanized metal roof deck 1 ½" deep X 22 gage wide rib is welded in with puddle welds. Maximum span allowed currently is 5'-6".

Breadth II: Acoustical:

Due to the new ceiling design, an acoustical study of how this redesign will affect reverb time and other acoustical requirements will be implemented. Careful consideration to the slope of the ceilings and individual panels will be investigated. Reverb time will also be affected by the volume of the space which will be examined as well.

Spring Semester Schedule: Gantt Chart

