



North Instructional Building  
Bronx Community College  
Bronx, NY

## Thesis Proposal

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## Executive Summary

The Bronx Community College's North Instructional Building, also known as the North Hall and Library, complements surrounding historical landmarks such as the Gould Memorial Library and the Hall of Fame. Its design pays tribute to the classical style of campus while providing state of the art classrooms, a double story library, and faculty offices.

The lighting depth encompasses the redesign of the lighting in these five spaces.

- Exterior Entry
- Lobby
- Corridor
- Library
- Law Classroom

An architecture breadth will be done in order to redesign the law classroom in order to better serve the multipurpose space, improve spatial functionality, and provide improved opportunities for lighting systems.

The second breadth of my proposal will research various photovoltaic roof systems and select the optimal system to implement into the building. This study will and equipment specification will tie in with the electrical design work. The breadth will include a cost analysis and payback calculations.

The electrical depth will be in response to the redesign of the lighting and the addition of the photovoltaic system. New loads will need to be calculated and lighting panel boards and feeders resized. Additionally the electrical system will need to be redesigned in order to implement the photovoltaic roof system researched in my architectural breadth.

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## Building Overview

Building Name: North Instructional Building

Location and Site: Bronx Community College, Bronx, New York

Building Occupant Name: Bronx Community College

Size: 98,600 square feet

Stories: 3 + 1 basement

The Bronx Community College's North Instructional Building, also known as the North Hall and Library, complements surrounding historical landmarks such as the Gould Memorial Library and the Hall of Fame. Its design pays tribute to the classical style of campus while providing state of the art classrooms, a double story reading room, library, and faculty offices. The building can be easily navigated. Classrooms are located on the first floor and contain wall mounted projectors, white boards, and flexible furniture to support various layouts. The large double story reading room is found on the second floor which is easily accessible from a central staircase adjacent to the central lobby. At the base of the reading room are long study tables mixed with computer carrels. Wrapping around the double height space is a walkway with study tables and book stacks on the east and west ends. Light shines through the very large windows to provide a considerable amount of natural daylighting to the space. The faculty offices can be found in the mid-level extension off of the west wing which was designed in proportion to the Gould Memorial Library.

## Project Team

Architect of Record: Robert A.M. Stern Architects, LLP

Associate Architect: Ismael Leyva Architects

Civil Engineer: Gedeon GRC Consulting

Structural Engineer: Robert Silman Associates, P.C.

M.E.P Engineer: Joseph R. Loring and Associates, Inc.

Lighting Designer: Cline Bettridge Bernstein

Contractor: TDX Construction Corporation

## Lighting Depth Proposal

Spaces studied:

- Exterior Entry
- Lobby
- Corridor
- Library
- Law Classroom

### Design Concept

The North Hall and Library is the new face of the college campus and the heart of learning. It aims to inspire everyone who enters or passes by. The lighting should be conducive to this excitement to learn and grow. The classical style provides many architectural features to be brought to life, to excite and inspire by displaying depth and dimension. These two words, Depth and Dimension, will be influential throughout all of the proposed designs by showcasing the architecture to create inspiring spaces.

### Professional Designer Comments

#### Lee Brandt

- Exterior rendering. What is the hierarchy? Columns? Glow from Pendants? Lobby, everything seems to be same brightness
- Design solution is kind of boring
- Why the different styles/finishes on the concept luminaires. Make them the same.
- Lee was confused about the geometric layout (this is symptomatic of a general lack of clarity in the presentation).
- You could benefit from going through some architecture magazines. To get inspired.

#### Charles Stone

- You could be a good presenter. You should practice in front of a mirror. You need to learn how to use the pointer.
- Lee's comment about finishes not matching.
- Don't jiggle around with the pointer. Hold it steady like a weapon, don't wiggle it around.

- Why show only top of corridor—you need to show the entire corridor, not just the ceiling.
- Once you put a criterion on the slide, then you need to actually talk about it.
- W/ classical architecture, the pendant hangs in the center of the arch.
- The layout of the slides needs work. There is a graphics problem running through your presentation. You're crowding the words. The brightness of the text versus the renderings is not right.
- You need to adjust your colors. The green cove, and orange. It's confusing. Are you implying different color temperatures?
- You are creating an abstraction. A language.
- Wall sconce is the same size and the chandelier, which is the same size as the downlight. The scales are all problematic. It's more confusing that clarifying.

## Exterior Space

The North Instructional Building's (NIB) north entry is denoted by a colonnade at the base of the structure with a regressed canopy. The canopy features an arched ceiling constructed of brick laid in a decorative pattern. Out front is a large open plaza connecting the campus sidewalk and the entrance of the building. Important design criteria include way-finding, public safety, security and a clear contrast from the rest of the building.

My design for the entry will draw attention to the arches by up-lighting from the ground. This will be the highest intensity light allowing people to find the entrance easily. General ambient lighting under the canopy will be provided by decorative pendants aligned with the center of each archway. These fixtures will complement the architectural style and provide omnidirectional light distribution. The large open plaza will be lit with pole lighting that will match those currently used on the campus. Sufficient light will be provided to ensure safety and security outside of the building.

## Lobby

Upon entering the building you pass through a brief vestibule then into the information lobby and finally into the main central lobby space. The vestibule serves as an air exchange and hosts the fire alarm auxiliary equipment. After the brief transition through the vestibule you arrive in the information area of the lobby. There is a double sided computer stand in the center of the space and two televisions on the east and west wall. Following the vestibule and information area is the main lobby which is the central circulation space of the entire building. Continuing

straight through the lobby would lead you to the monumental stair going up to the library or if you could branch off to the east and west corridors and arrive at the classrooms. The lobby serves circulation, way-finding and a place to socialize among occupants. Important design criteria for these spaces are to establish a clear focal point and generate a comforting design which draws out the depth of the architecture.

Foremost I intend to change the ceiling design of both the information area and main central lobby. The new design will add a new dimension to the spaces by providing cove lighting techniques. The information area cove design will be split down the center suggesting two walking paths into the main lobby. Each of these two coves will be adorned with a chandelier luminaire that will also provide ambient lighting. Matching sconces will be placed in the four corners of the room to fill the extents of the room with proper illuminance levels.

### **Corridor – Psychological Impression**

The corridor runs east to west off of the central lobby guiding students to the state of the art classrooms on the ground floor and serves the main exit path in case of emergency evacuations. Originally, classically styled architectural columns line the walls appearing to support the pattern of rectangular soffits continuing through the corridor. The ceiling between these columns contained even smaller rectangular soffits to complete the classical style. The flooring pattern mirrors the ceiling with a combination of porcelain and terracotta tile. At the entrance of each classroom, the corridor extends towards the south wall creating a secondary rectangular area which provides access to electrical, data, and storage spaces adjacent to the corridor. The lighting in the corridor must create an appealing and intuitive passageway to guide the user to their destination. A corridor should be appealing in its physical appearance as well as psychological impression. The lighting must synchronize with the elegance of the architecture and provide a sense of spaciousness and fluency in the understanding of its design. The architectural color palette is a mix of light color tones which the lighting should complement in providing a soft glowing, glare free environment with exceptional rendition of colors.

Just like the lobby, I propose changing the ceiling in the corridor to allow the lighting to add greater depth to the space by providing cove features. The coves will also aid to creating the psychological impression of spaciousness in the corridor. In addition to the coves, the corridor walls will be grazed by slot ceiling fixtures to provide uniform lighting to the walls. The combination of these two systems will supply high intensity, uniform illuminance to the corridor to create a spacious passageway.

## Library

The second and third floor features the library, which showcases an enormous double height reading room. The library is rectangular in shape and has a two adjacent barrel vaults for its ceiling which are supported by centralized columns between the arches. The reading room lies in the center of the library and is open to the third floor above. Study carrels, computer stations, and long study tables cover the open floor. Along the wooden banner around the reading room's opening to above are paintings done by a local artist. Large windows on the south wall provide the space with a generous amount of daylight. The amount of daylight is controlled with motorized shades under the control of the library's management staff. Important design criteria include the facilitation of reading, writing, and computer use while providing peripheral illumination that creates a visually clear environment to maintain concentration.

The lower level will be illuminated by sconces located on all four sides of the central columns. A custom sconce with integral downlight may be required upon future fixture research and calculation to support the task lighting levels required. In addition to these sconces, the lower level will receive light from the large direct-indirect pendant fixtures hanging from the ceiling above. These pendants provide general ambient illumination to both the lower and upper level of the library as well as spread light onto the barrel vaulted ceiling displaying the tremendous volume of the space. Peripheral illumination is created by sconces to light the seating and walkway next to the walls of the upper level. Sconces are located on each column along the length of the room. Book stacks on the third floor will be self-illuminated and activated by local occupancy sensors. Each fixture compliments the classical architecture while supplying light to support each task and enhance the depth the space presents.

## Law Classroom

The third floor of the southwest wing contains a multipurpose room to hold lectures, courtroom mockups, and store the law stacks. This multi-purpose room's geometry is unique to the other spaces. Its ceiling angles inward from the North/South walls which are joined by a flat plane in the center of the room. Law stacks line the North/South walls and also occupy the West half of the room. The eastern half of the room is occupied by multiple wooden tables and chairs that may be rearranged to adhere to different teaching styles or create a mock-up courtroom setting.

I plan to redesign this space for my architectural breadth for which I will develop three different architectural designs and supplemental schematic lighting designs to enhance this space to



achieve all of its original intentions. The design criteria for this unique room is to create a pleasant work environment that excites and brings added dimension to the space. The design should facilitate concentration on reading, writing and computer use. Additionally, the stacks will need to be addressed in the design. The architectural design may influence whether they continue to be lit with an integral bookcase luminaire or via a stationary, non-integral, system.

## Tasks and Tools

The spring semester will consist of bringing the schematic design into the construction document phase through various tasks and use of technical software. The primary programs used will be Revit and AGi32. Spaces will be modelled in Revit and exported into AGi32 for lighting calculations. Final Rendering may be performed in Revit, AGi32, or 3DStudio max.

## Electrical Depth Proposal

The North Instructional Building receives 4.16 KV electric service from the campus. The electric service entering the building has two active and two spare lines connecting to the main switchboard (SWBD). The voltage is turned down from 4.16 KV to 480Y/277V power in the SWBD. The switchboard has eleven breakers, eight of which supply 480Y/277V power to four chiller compressors, a branch circuit power panelboard for the basement, a branch circuit power panelboard for the roof mechanical room, an emergency distribution panelboard, and two distribution panelboards supplying lighting and receptacle loads in the east and west wings. All equipment supplied by the branch circuit power panelboards runs off of 480V 3 phase power. The two distribution panelboards, one in the east wing and one in the west, supply 480/277V power to lighting panelboards supplying the basement and all three levels above grade. The emergency distribution panelboard is also supplied 480/277V power and is backed up by a diesel generator connected with an automatic transfer switch. The east and west distribution panelboards supply power for lighting and receptacle loads. The emergency distribution panel supplies power for elevators, emergency lighting and receptacle loads, security systems sprinkler systems, and smoke dampers. All lighting loads are operated at 277V single phase power and receptacle loads are stepped down locally from 480/277V at each lighting panelboard to 208/120 on the receptacle panelboards. Receptacles only receive 120V single phase power.

The electrical depth will be responsive to the modifications of the lighting within the five spaces selected. New loads will need to be calculated and lighting panel boards and feeders resized.

Additionally the electrical system will need altered in order to implement the photovoltaic roof system researched in my architectural breadth. I intend to select a photovoltaic roof system from my architectural breadth research and design this into my electrical system. This will include cost analysis and payback computations.

## **Breadth 1: Photovoltaic Roof System**

I intend to research multiple photovoltaic roof systems that I could use for additional power generation. I will analyze each system option to find the optimal fit for my building such as cell structure, array layout, and equipment selection. The results of this study will be used to design for the implementation of this system in my electrical depth.

## **Breadth 2: Architecture**

The law classroom is located on the third floor adjacent to the library. This room provides additional work space for students and accommodates the law book stacks. It is intended to be used for multiple purposes such as a classroom, mock-up courtroom, or simply a space to study. I intend to redesign this room in order to better serve this multifunctional space and provide improved opportunities for lighting systems. I will develop three different designs that which will coordinate with my three schematic lighting designs for this space.

# Spring Semester Schedule

2/20/2014		2/3/2014		2/24/2014		3/17/2014		4/14/2014	
Milestone 1		Milestone 2		Milestone 3		Milestone 4		Final Report Due	
1/20/2014		2/3/2014		2/24/2014		3/17/2014		4/14/2014	
1/13/2014	1/20/2014	2/3/2014	2/24/2014	3/17/2014	4/14/2014	1/13/2014	1/20/2014	2/3/2014	2/24/2014
Revise Schematic Designs	Fixture Selection	Revit modelling and Ag calculations	Lighting	Photovoltaic Research	Select Photovoltaic Equipment	Recessed Electrical System for implementation of photovoltaics	Finalize Lighting Renders	Final Report Due	Faculty Jury Presentation
Redesign Law Classroom									
Key	Lighting	Electrical	Architectural	Photovoltaic	Milestones	1. Architectural Breadth Complete	2. Revit modelling complete & (1) completed lighting space	3. Photovoltaic breadth complete & electrical breadth started	4. Electrical depth Complete