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Technical Report 1

Lighting Existing Conditions and Design Criteria Report

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AGI files are found in T:\Tech1\AGI

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Executive Summary:

The following report provides a detailed analysis of the existing lighting design and system of the Duke University Medical School- Duke School of Nursing building in Raleigh, NC. The report focuses on analyzing four different multifunctional spaces throughout the building. For each of these four spaces a lighting design criterion was developed in order to express our thoughts on how these spaces should appear or function. The report also analyzed the existing fixtures, ballasts, materials, and LLF within the spaces. The four spaces that were looked at in depth were: 54 seat outdoor courtyard area; a 64 seat café/ lounge area that is a double high space that has full height glass curtain walls that look out onto the courtyard; a 150 seat AV/multipurpose auditorium classroom; and a grand double high entrance lobby, which is located in the prominent Gothic tower portion of the building.

There was a common theme of being inviting and comfortable to all 4 of these analyzed spaces. However, the feeling desired in each space varied based upon the variety of uses each space encounters. Due to the multifunctional uses of these spaces, flexible controls are demanded by the spaces. Since the building is going for LEED certification, daylight integration as well as proper fixture and lamp selections are not only recommended but required in some cases.

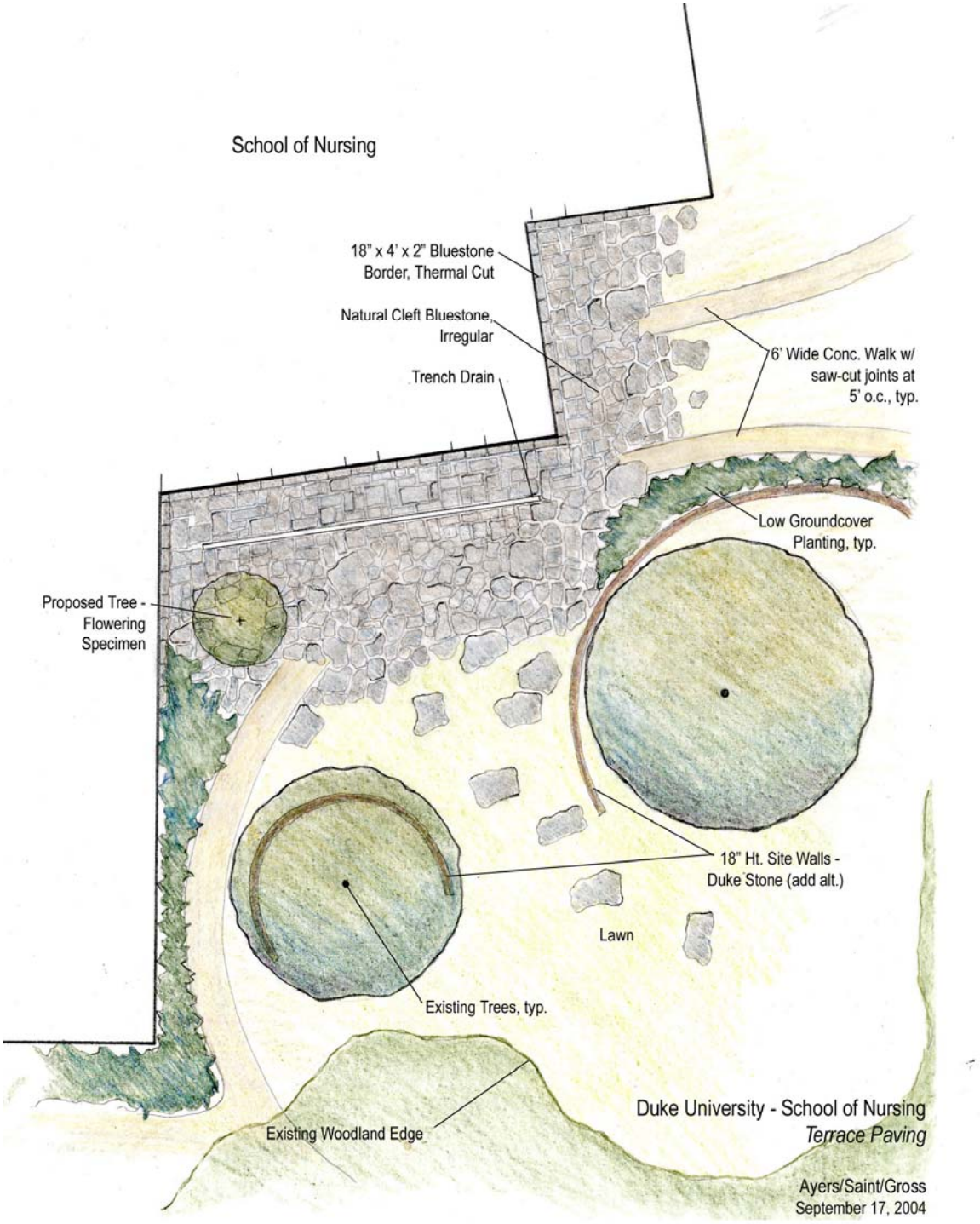
In my analysis of these four spaces I noticed that the courtyard and its points of interests were not really brought into the design. I realize that the courtyard receives a lot of ambient light from the adjacent double high glass curtain walls of the café but there is no accenting of prominent features or points of interest throughout the space. I feel that by applying accents to a few key elements then the courtyard would appear more inviting at night than in its current state. However, as a whole, the lighting design was very impressive and it appears the designers achieved their design criteria.

Finally, the ASHRAE/IESNA Standard 90.1 was analyzed to determine the existing lighting power densities for these four spaces. It was determined that each space met or was below the Space-by-Space Method standard. This means that in my redesign I will have the necessary flexibility to achieve my design criteria goals.

Champagne Courtyard- Overview:

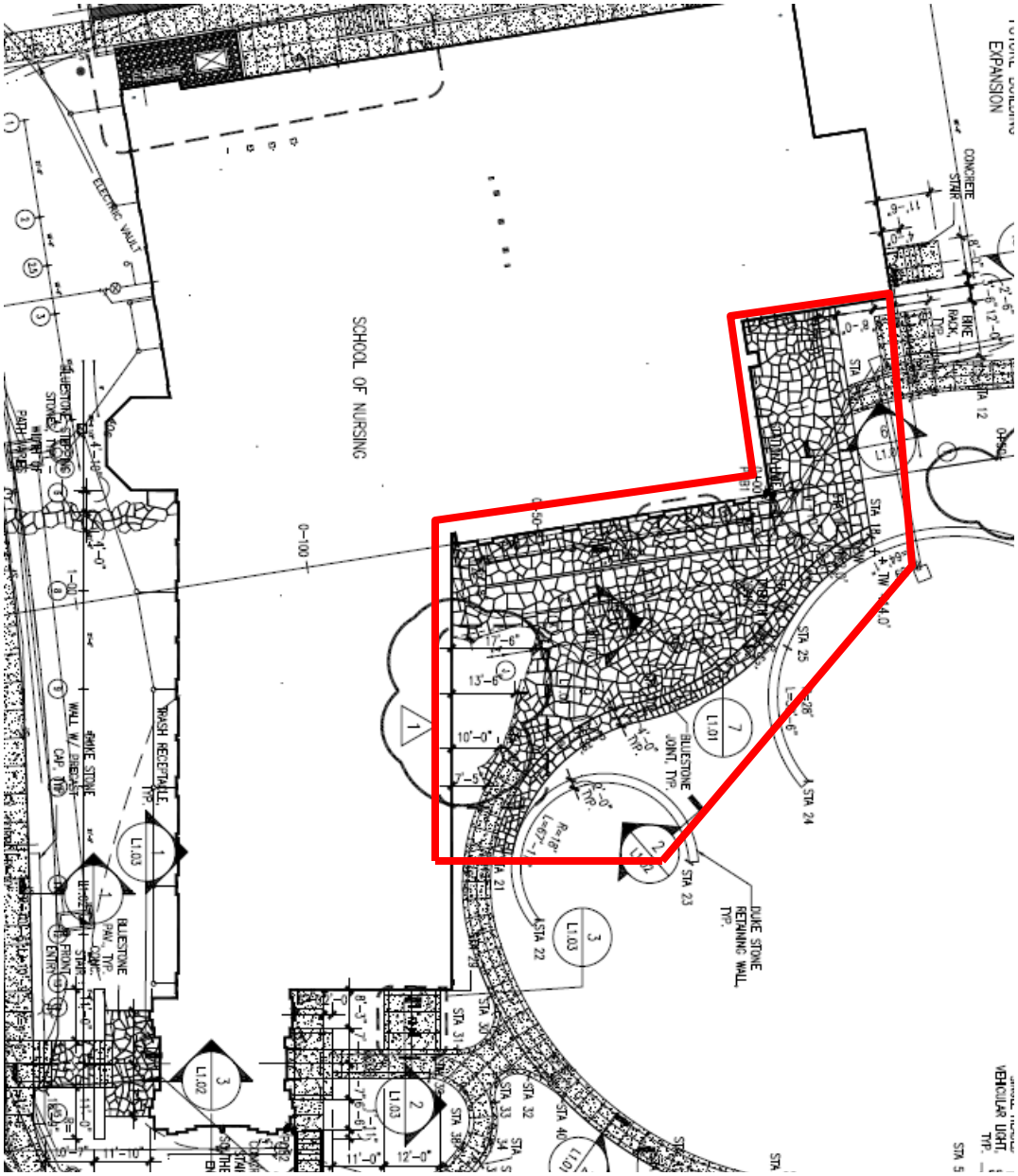
The courtyard is located on the East side of the building and covers an approximate area of 1450 SF. The courtyard serves as the outdoor portion of the Café DUSON lounge. There are tables and benches that seat approximately 54 people. The courtyard is intended to provide a sense of relaxation and comfort, with its gentle curving retaining walls, random natural cleft Bluestone paver pattern, and the incorporation of trees and shrubbery around the courtyard.

Champagne Courtyard- Conceptual Rendering Plan:



*The above is a conceptual rendering by ASG

Champagne Courtyard- Plan:



Champagne Courtyard- Existing Conditions:

Surface Materials within the Space:

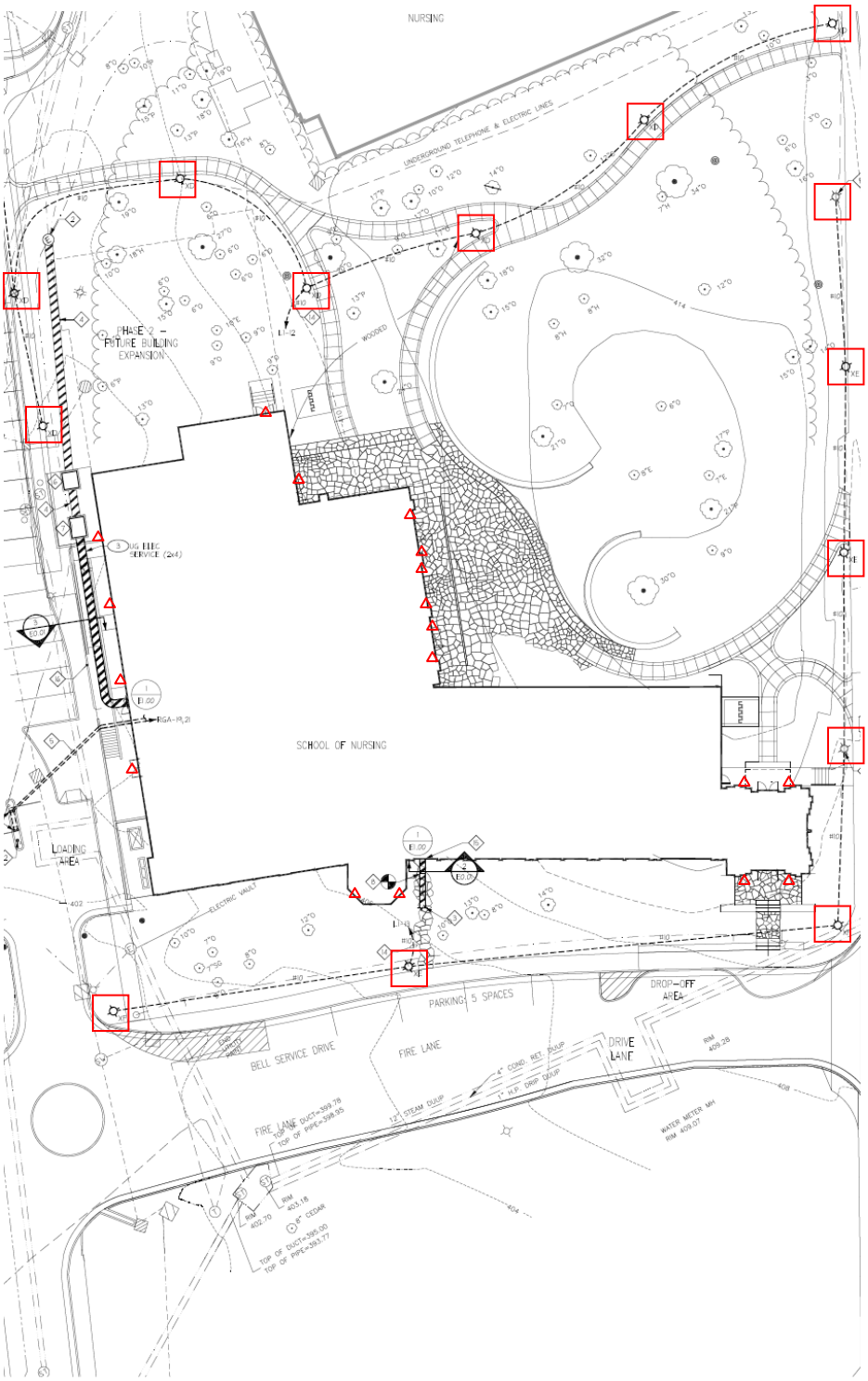
- Natural Cleft Bluestone walkway and courtyard
  - Reflectance = 15%
- Duke Stone retaining walls
  - Reflectance = 20%
- Gray Painted Aluminum Mullions
  - Reflectance = 25%

Glazing:

- **G-5 :** 1" Insulated Glass Curtain Wall System of Café DUSON
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

- **G-4 :** 1" Insulated Glass – Laminated (door glass)
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

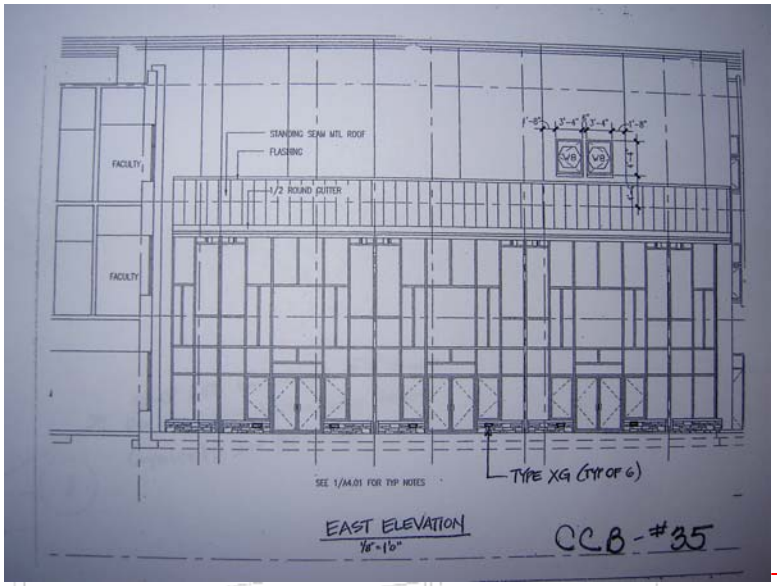
Existing Site Lighting Plan:

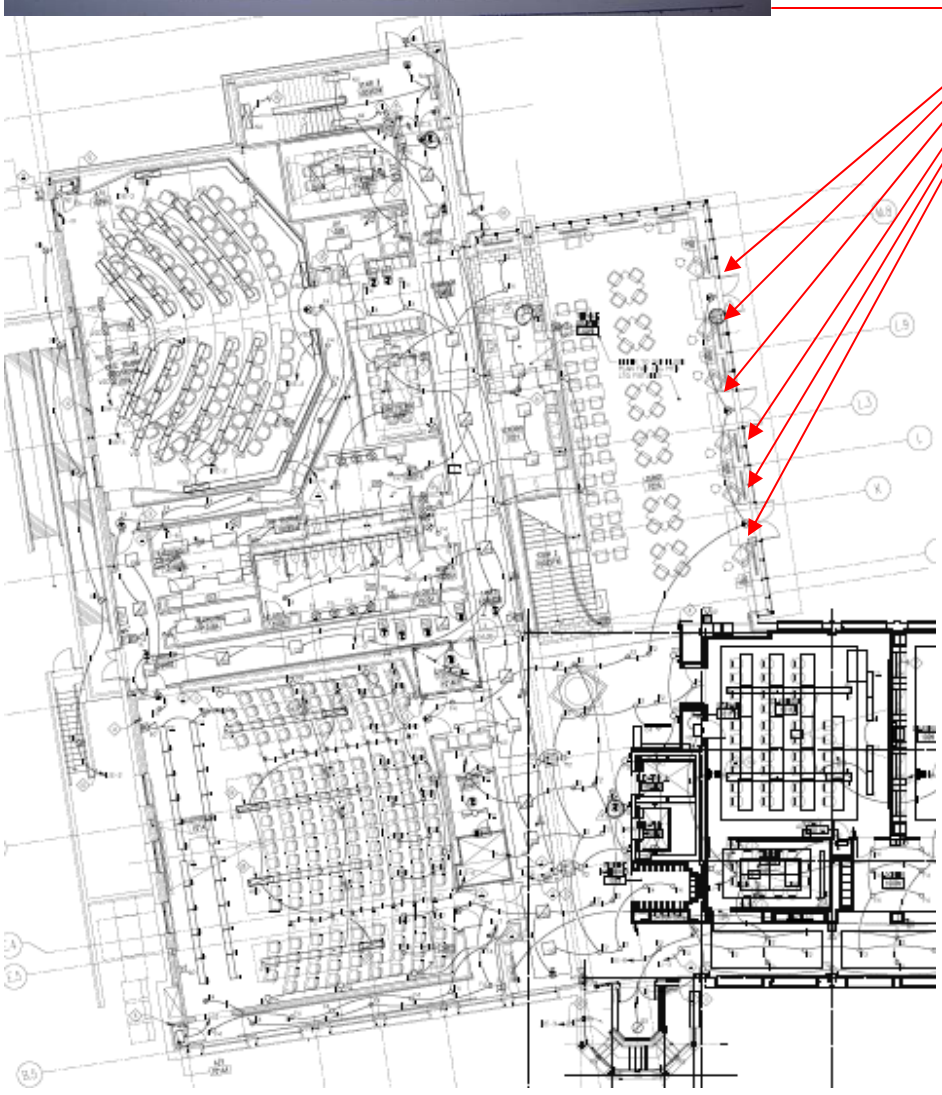


SITE PLAN – ELECTRICAL
SCALE: 1"=20'-0"

= Existing Fixtures
= Existing Fixts. Not Shown On This Plan

Champagne Courtyard- Existing Lighting Plan:





Champagne Courtyard- Luminaire Schedule

Champagne Courtyard Luminaire Schedule						
Type	Mounting	Manufacturer	Catalog Number	Lamps	Volts	Description
XB	Wall Surface	Lithonia	WST-2/32TRT-MD-277	(2) CF32DT	277	Trapezoidal; Full Cut-Off
XG	Wall Recessed	Architectural Landscape Lighting	SP-05-226F-277-BK	(2) CF26DD	277	Recessed Step light

Champagne Courtyard- LLF

Champagne Courtyard Assumptions				
Type	IESNA Maintenance Category	Distribution Type	Environment Cleanliness	Cleaning Cycle
XB	V	Direct	Dirty	18 Months
XG	VI	Direct	Dirty	18 Months

Champagne Courtyard Assumed LLF				
Type	BF	LLD	LDD	Total LLF
XB	0.95	0.85	0.75	0.61
XG	0.97	0.84	0.66	0.54

Champagne Courtyard- IESNA Design Criteria

Appearance of Space and Luminaires

- The courtyard is a space that is intended for people to gather and work or relax. With the knowledge of this intended use, it is critical that the space appear inviting and have a sense of pleasantness. The luminaire styles should accent the Duke University Architectural Style of Gothic Architecture.

Color Appearance

- The color appearance of the courtyard should have a slight warm tone to it. Being that the courtyard is adjacent to and essentially the outdoor portion of the warmly lit Café DUSON, it is critical that the courtyard carry similar characteristics.

Controls

- All the outdoor luminaries within this space should use automatic controls. These controls could be photo-controlled sensors or an astrological time clock.

Glare

- The main space that is adjacent to the courtyard is the Café DUSON. Being that the café has three double high glass curtain walls directly adjacent to the courtyard, glare is a critical consideration. The courtyard is intended to have a comfortable feel to it and in order to maintain this feeling both direct and reflected glare must be taken into consideration.

Light Distribution on Surfaces

- For public safety some degree of uniformity must be maintained. However, to create visual interests and bring out the inherent textures of the materials of the space, grazing and other forms of non-uniformity should be used.

Light Distribution on Task Plane

- The courtyard and its walkways are some of the main means of egress from the building and therefore require the walkways and courtyard surface to maintain a sufficient level of uniform light distribution.

Modeling of Faces and Objects

- The courtyard is used by occupants of the building as well as passersby therefore face and object recognition is important for security and safety reasons.

Points of Interest

- The trees surrounding the courtyard were an important part of the building, since these trees are original to the site. The architecture of the courtyard retaining walls highlight their existence and give them a sense of importance to the space. For this reason, accenting these trees with light will reinforce this design objective and provide a point of interest.

Shadows

- Shadows should be avoided in the interest of safety and security.

Surfaces Characteristics

- The courtyard has a variety of stonework and trees that should be highlighted to some extent to draw out their natural textures.

Illuminance (Horizontal & Vertical)

- IESNA recommends a horizontal illuminance of 50 lx (5 fc).
- IESNA recommends a vertical illuminance of 30 lx (3 fc).

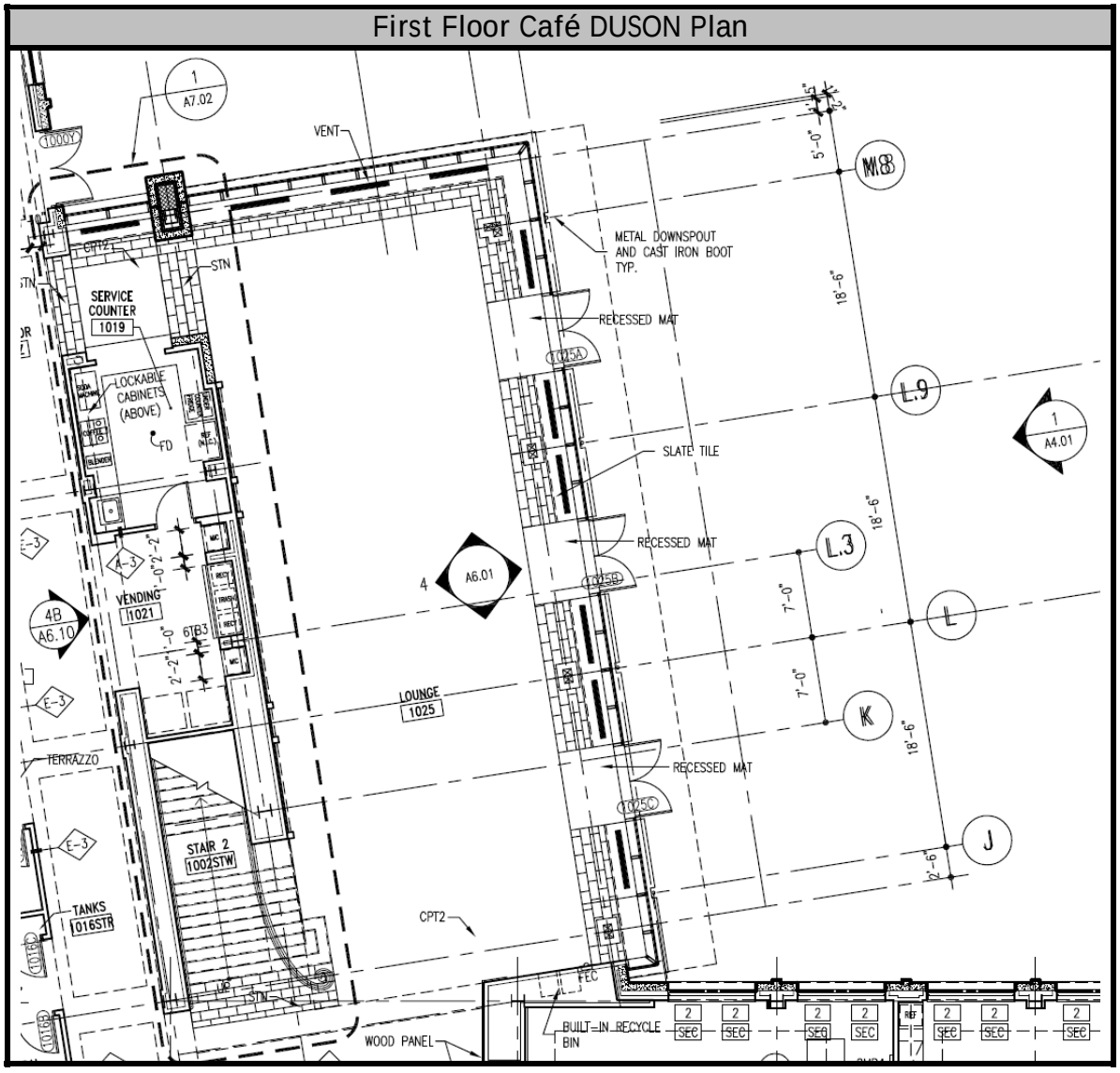
Critique:

After reviewing the existing lighting plans of the courtyard, I realized that this space is not really lit by exterior fixtures. Most of the space seems to be illuminated by the light coming from the large glass curtain walls of the Café DUSON. This space has a few points of interest that I think would be worth lighting. I am curious as to why the courtyard was not really illuminated and I intend to talk to the designers to find out why.

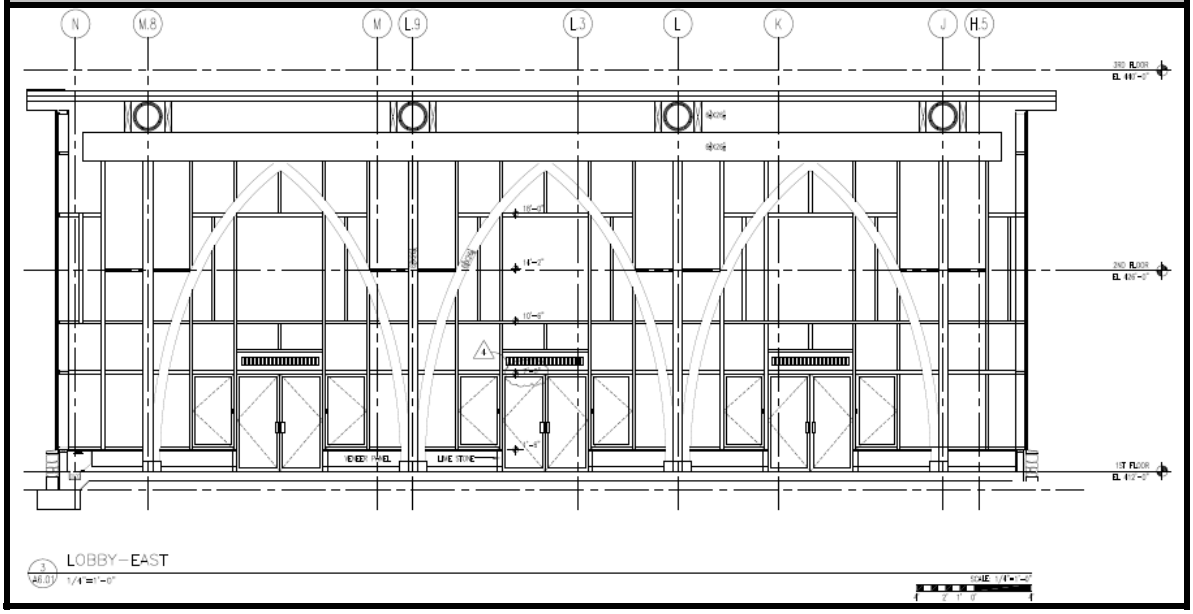
Café DUSON- Overview:

Café DUSON is a study lounge with seating and tables to seat approximately 65 people in an area of about 1850 SF. The café is a double high space with full height windows on the two exterior walls. This space also contains large arching roof supports that are large wooden timbers and made to look like Gothic Cathedral arches, which follow the Duke University architectural style. Café DUSON is designed to hold a feeling of relaxation while still having a studious atmosphere.

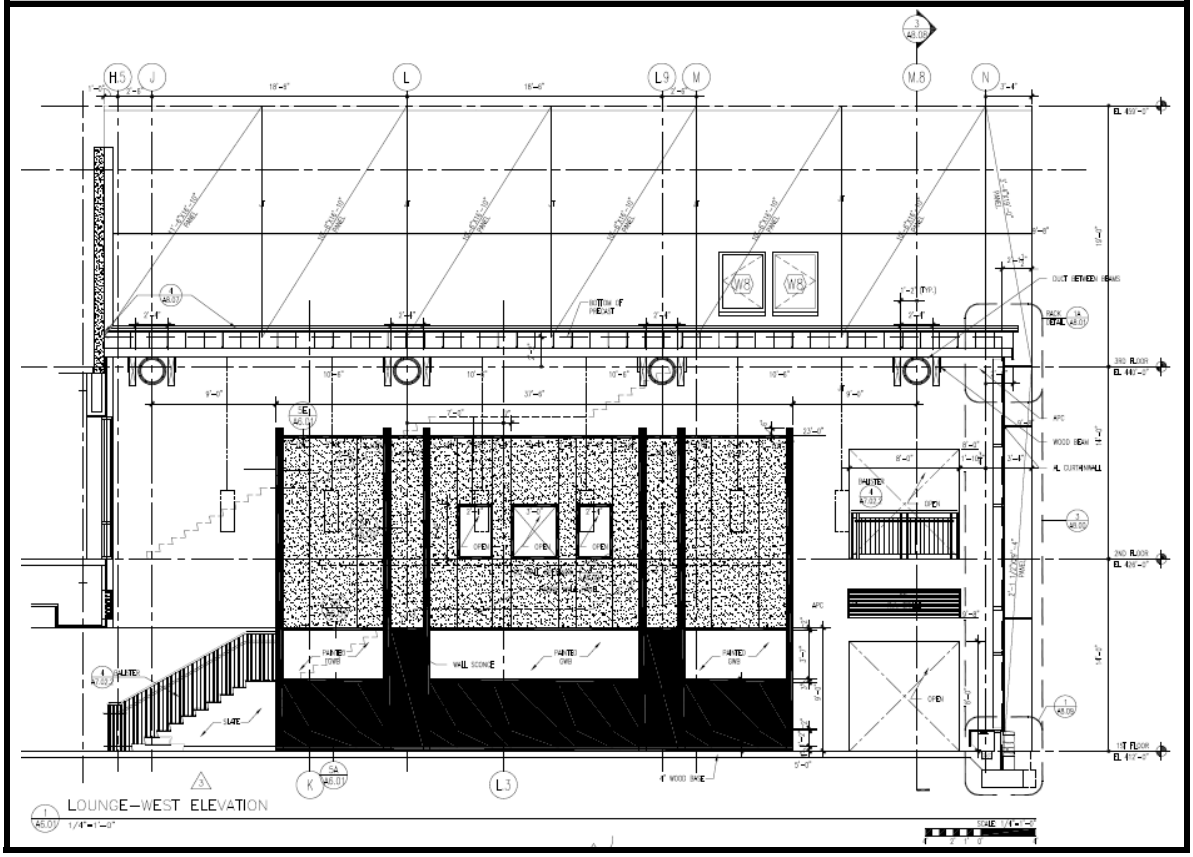
First Floor Café DUSON Plan



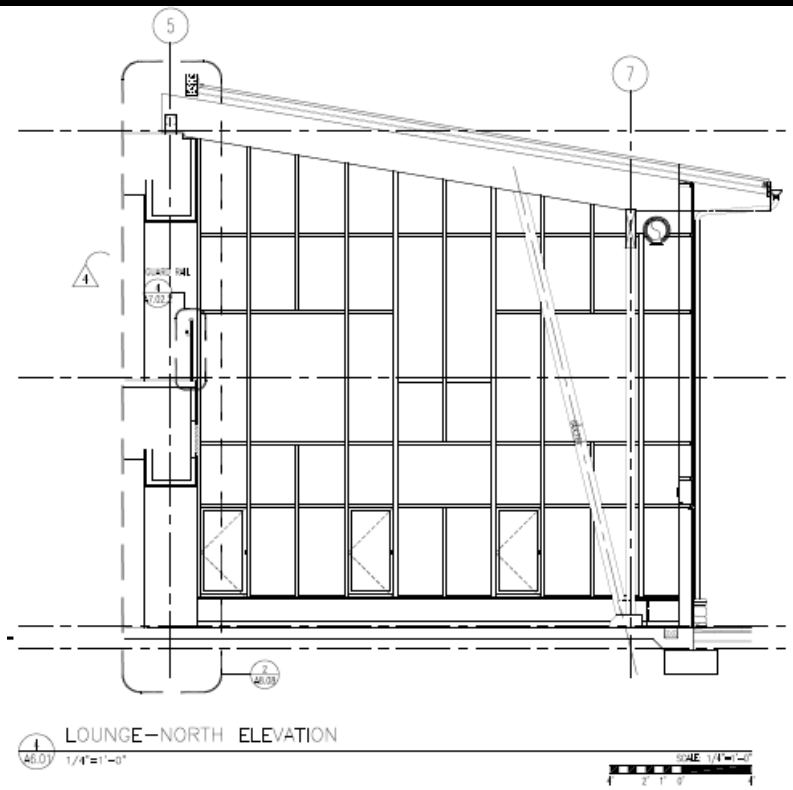
First Floor Café DUSON East Interior Elevation



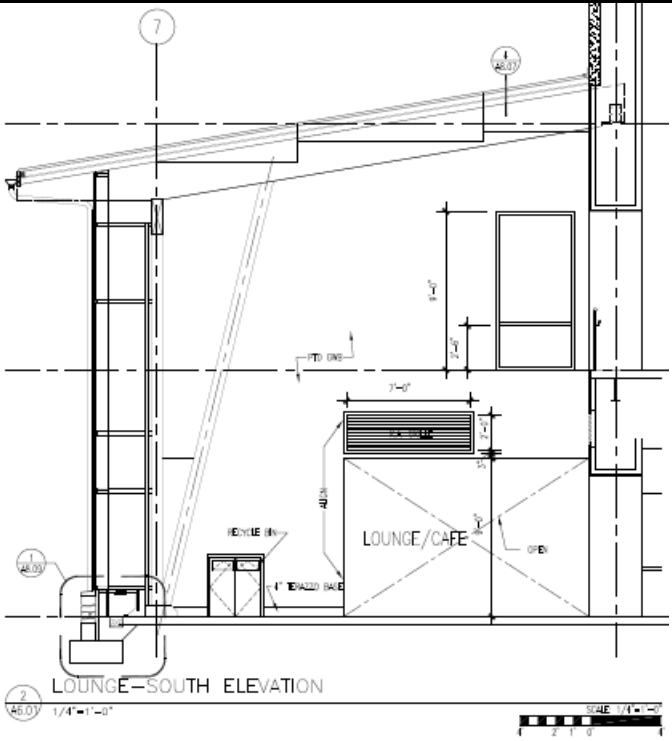
First Floor Café DUSON West Interior Elevation



First Floor Café DUSON North Interior Elevation



First Floor Café DUSON South Interior Elevation



Café DUSON- Existing Conditions:

Surface Materials within the Space:

- Gray Thin Carpeting
  - Reflectance = 25%
- Natural Wood Ceiling
  - Reflectance = 70 %
- Natural Wood Timber
  - Reflectance = 70 %
- White Painted GWB
  - Reflectance = 60 %
- Slate Wall
  - Reflectance = 20%
- Acoustic Wall Panels
  - Reflectance = 38%
- Gray Painted Aluminum Mullions
  - Reflectance = 25%

Glazing:

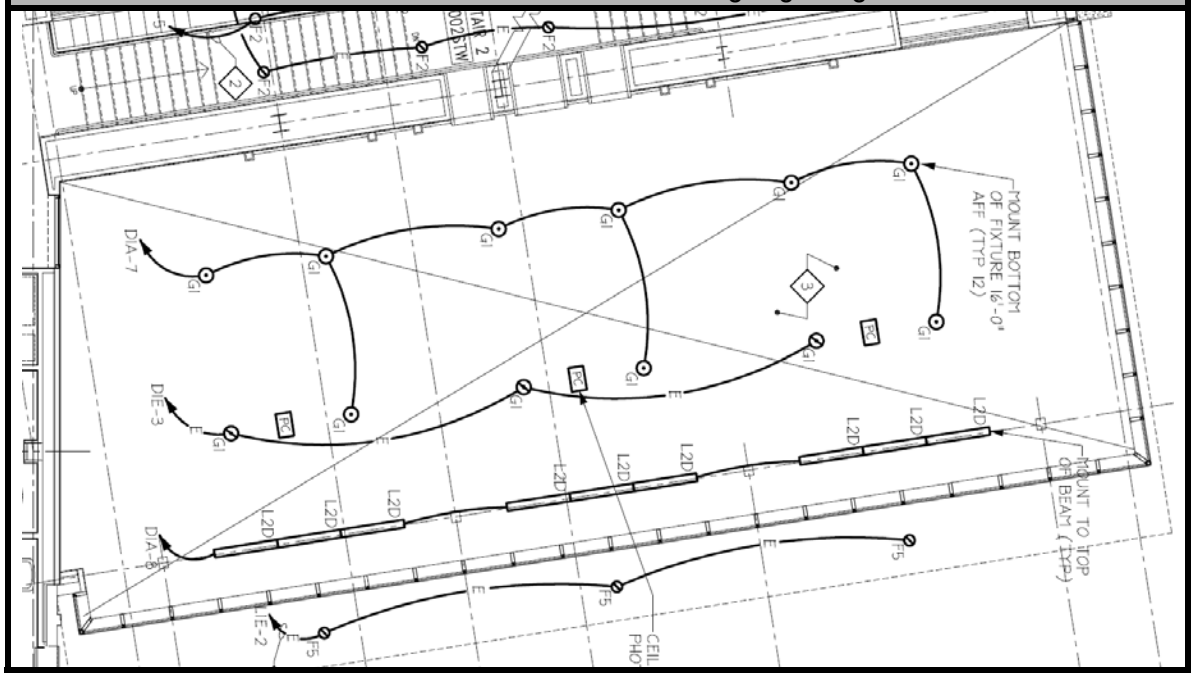
- **G-5 :** 1" Insulated Glass Curtain Wall System of Café DUSON
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

- **G-4 :** 1" Insulated Glass – Laminated (door glass)
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

Café DUSON- Existing Lighting Plans:

First Floor Café DUSON Existing Lighting Plan

Second Floor Café DUSON Existing Lighting Plan



Café DUSON- Luminaire Schedule

Café DUSON Luminaire Schedule						
Type	Mounting	Manufacturer	Catalog Number	Lamps	Volts	Description
G1	Ceiling Pendant	Shaper	M482-12x36-CFL/4/40-277-SAL-DM-HTB/VTB	(4) FT40DL/835	277	Matte Acrylic Cylinder Pendent
L2D	Beam Surface	Winona Lighting	P1-MC-148T5-277V-MCVU-RA-DM	(1) FP28/835/ECO	277	Beam Mtd. Cove Uplight
M1	Wall Surface	Shaper	673-T5/1/21-277V-SSS	(1) CF26DT/E/835	277	Half Cylinder Wall Sconce

Café DUSON- LLF

Champagne Courtyard Assumptions				
Type	IESNA Maintenance Category	Distribution Type	Environment Cleanliness	Cleaning Cycle
G1	IV	Direct	Clean	12 Months
L2D	VI	Indirect	Clean	12 Months
M1	II	Direct-Indirect	Clean	12 Months

Café DUSON Assumed LLF					
Type	BF	LLD	RSDD	LDD	Total LLF
G1	0.98	0.83	0.96	0.89	0.70
L2D	1.01	0.89	0.87	0.85	0.66
M1	0.98	0.84	0.91	0.93	0.70

Café DUSON- IESNA Design Criteria

Appearance of Space and Luminaires

- Café DUSON is intended to posses a relaxing atmosphere, where you can relax and take a break from the busy schedule of the day. This space already posses some inherent properties of relaxation with its double high ceiling, natural wood beams, columns, wall paneling and ceiling. Also, the lounge looks out directly onto the courtyard with its gradual curves and the large trees surrounding it. The café also has a modern feel to it with the exposed round air ducts and glass and aluminum curtain walls. Therefore, the styles of the luminaries should have a slight modernistic style to them while still holding to the Duke Gothic style.

Color Appearance

- The color appearance of the café should have a warm tone to it to enhance the natural tones of the wood throughout the space and maintain the intended feeling of relaxation.

Daylight Integration and Controls

- Café DUSON has glass curtain walls that face North, East, and South. For this reason daylight integration should be utilized to save electrical energy. Also, this space could potentially be used for other events, such as banquets or parties. Therefore, an adjustable control system should be utilized to provide a versatile lighting system.

Direct Glare

- Direct glare from the luminaires is a concern, since the space is intended to have a feeling of comfort and relaxation. Direct sun glare from the easterly glass walls is a concern. However, the large trees that surround the courtyard could potentially diffuse some of the direct glare from the sun on the eastern curtain wall.

Light Distribution on Surfaces

- The space contains a lot of expensive wood work and should be light in such a way to bring out its natural beauty. Also, there is a 3-dimensional quality to the wooden arches, beams, and columns that should be expressed. Therefore, portions of the wood should have uniformity while also providing depth with shadows and direct lighting.

Light Distribution on Task Plane

- The task plane should be relatively uniform since there are tables and chairs for studying and working. Also, since this space could potentially have multiple uses, the task plane height could vary but should still maintain a uniform light distribution.

Modeling of Faces

- Modeling of faces is not of great importance. This space is intended for a relaxing work atmosphere, and therefore having a high vertical illuminance on the peoples' faces is actually not recommended.

Points of Interest

- The large wooden arches that look like Gothic cathedral arches and the wooden columns that support the roof system is a well defined point of interest within the space.

Shadows

- Some shadowing is desired to achieve a sense of depth with the large wooden timbers and arches. However, shadows are not desired on the task plane.

Surfaces Characteristics

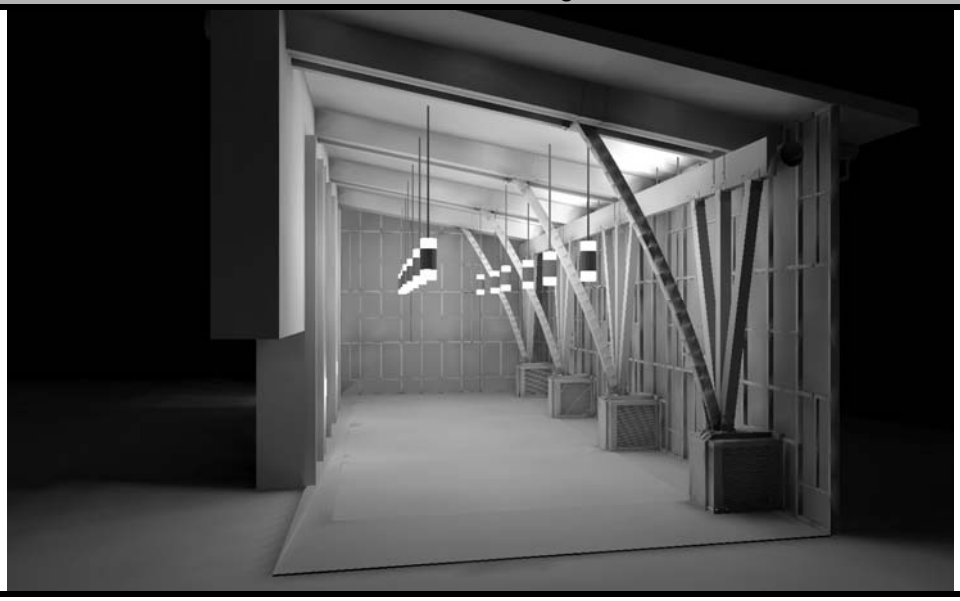
- The café contains a variety of surface materials. Some of the most prominent materials in the space is natural wood and of course the glass from the curtain walls. The space also contains some slate wall paneling which if lit properly would expose its natural texture.

Illuminance (Horizontal & Vertical)

- IESNA recommends a horizontal illuminance of 300 lx (30 fc) for a lounge.
- IESNA does not recommend a vertical illuminance value for a lounge.

Café DUSON- Existing Lighting Calculations

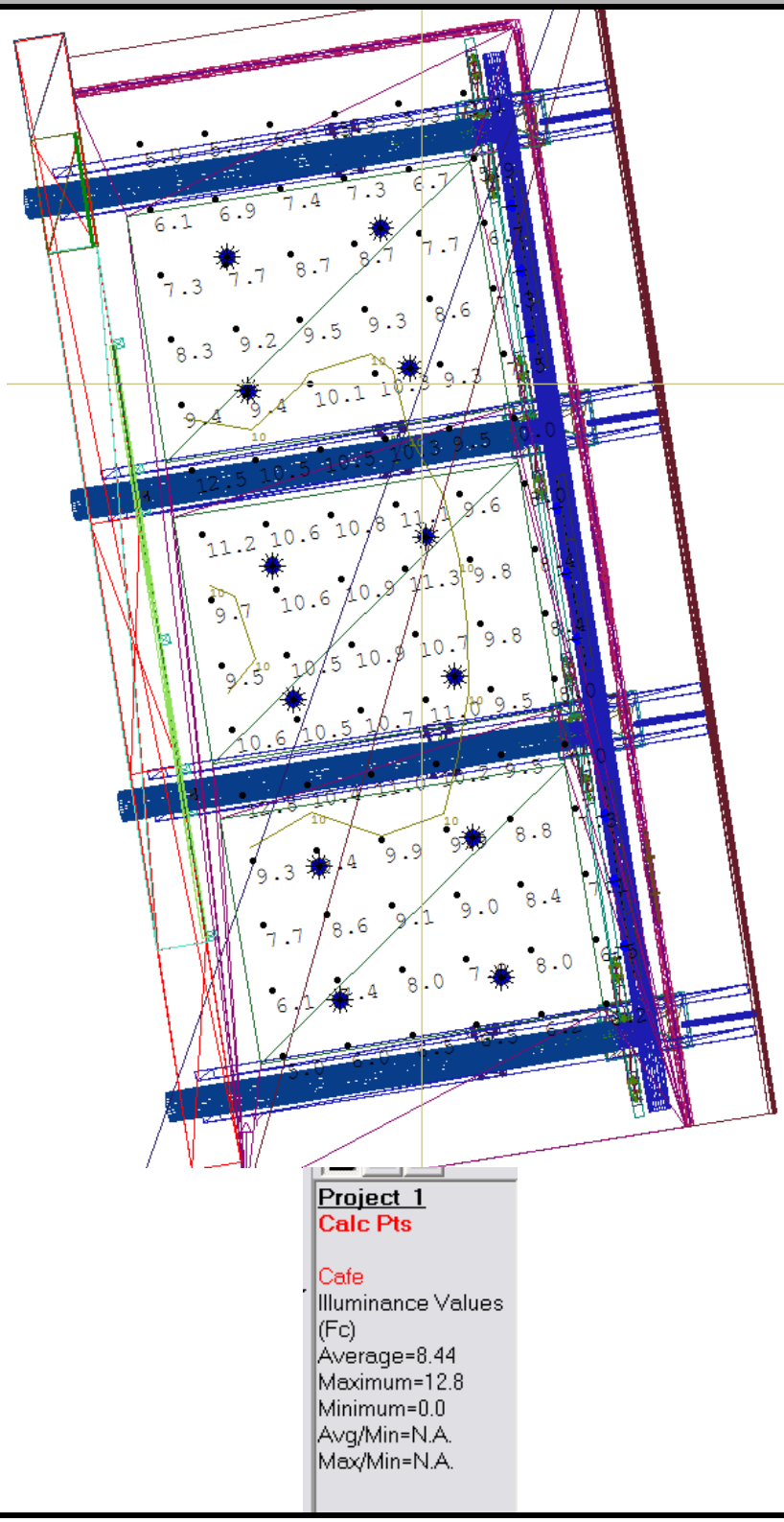
AGI Renderings



AGI Renderings

AGI Renderings

AGI Calculation and Contours



Critique:

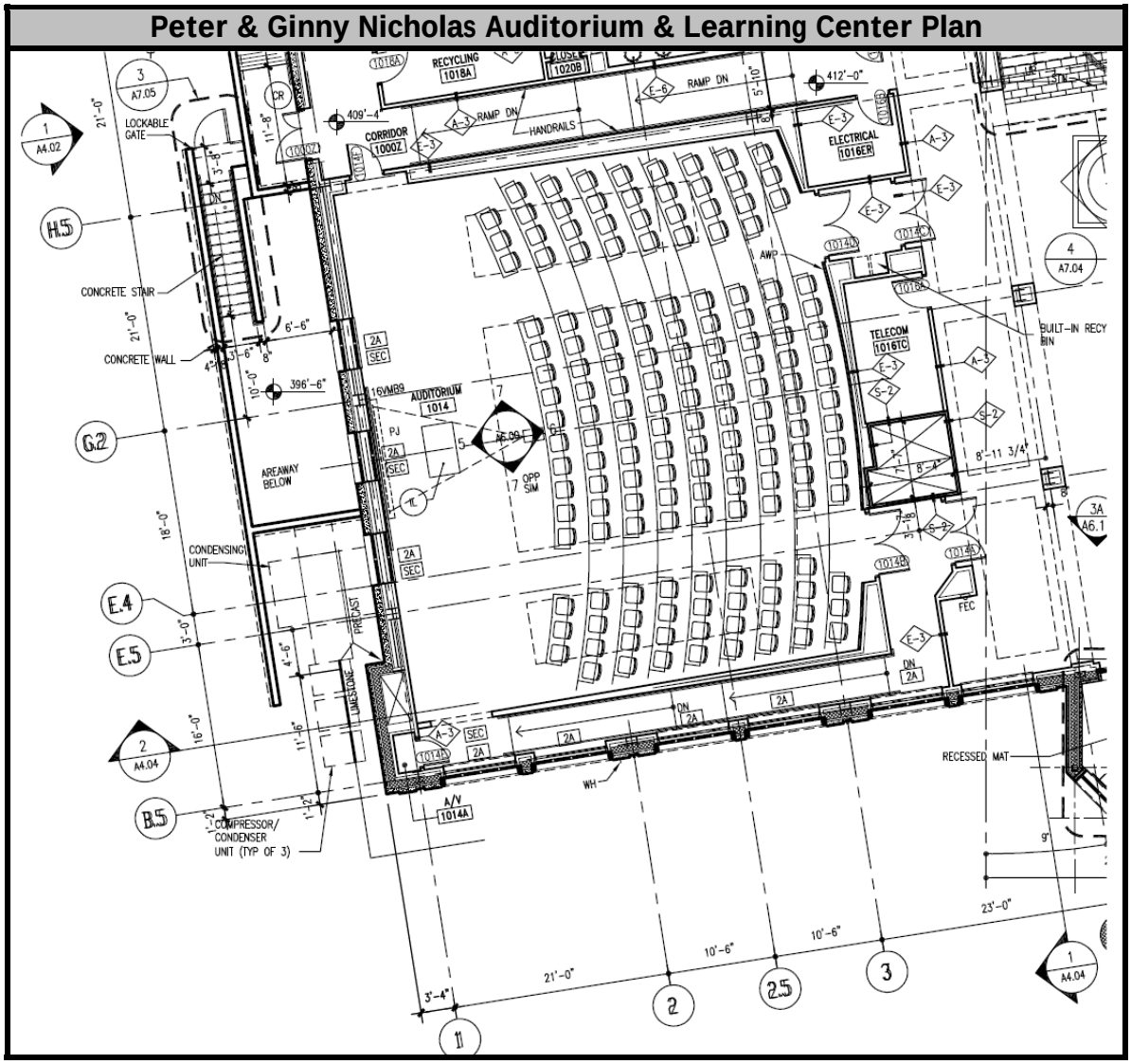
The lighting designer of the space achieved the proper mood for the space, a sense of relaxation. Also, the architecture and the lighting system compliment each other. After performing the existing lighting calculations on the space, I realize that my model has a few flaws that significantly reduce the illuminance levels of the space from where they should be. The main flaw is that there are large openings that would have light if this were a full model of the building. The light is lost in these large openings that would have light on them in real life, and therefore reducing the actual light levels. As seen from the real life pictures, the space appears to be adequately lit and comfortable.

Peter & Ginny Nicholas Auditorium & Learning Center Overview:

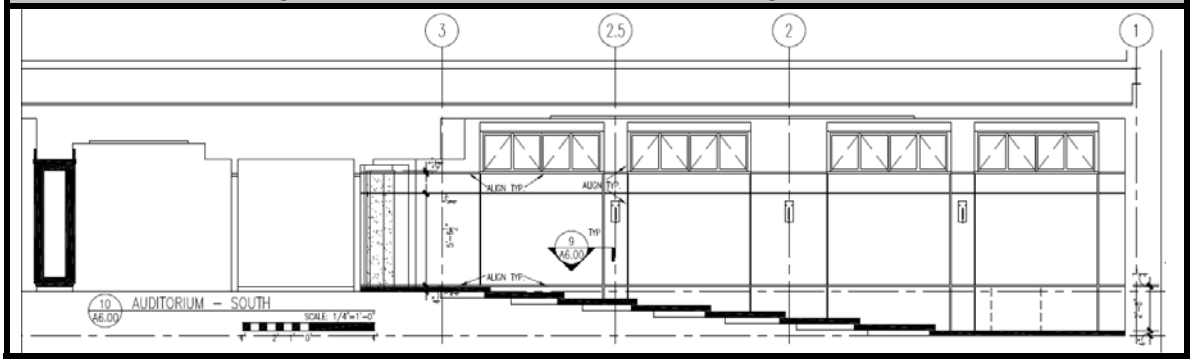
The Peter & Ginny Nicholas Auditorium & Learning Center is a large auditorium used as a classroom and meeting area. The auditorium has seating for approximately 150 people and covers an area of approximately 2670 SF. The seating and desks are permanent fixtures within the space. The floor gradually steps down from the back of the room towards the front of the room where the lecturer stands. This stadium seating effect allows the farthest people in the back to be able to not only see but also hear the lecturer. The auditorium is intended to be a classroom and meeting place, and therefore requires a sense of visual clarity as well as set a studious atmosphere.

*The above is a photo realistic conceptual rendering by ASG

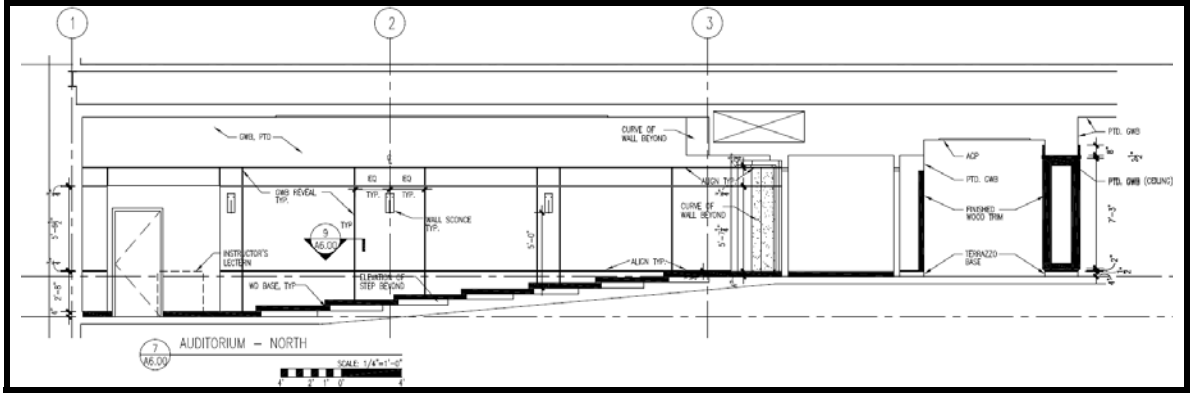
Peter & Ginny Nicholas Auditorium & Learning Center Plan



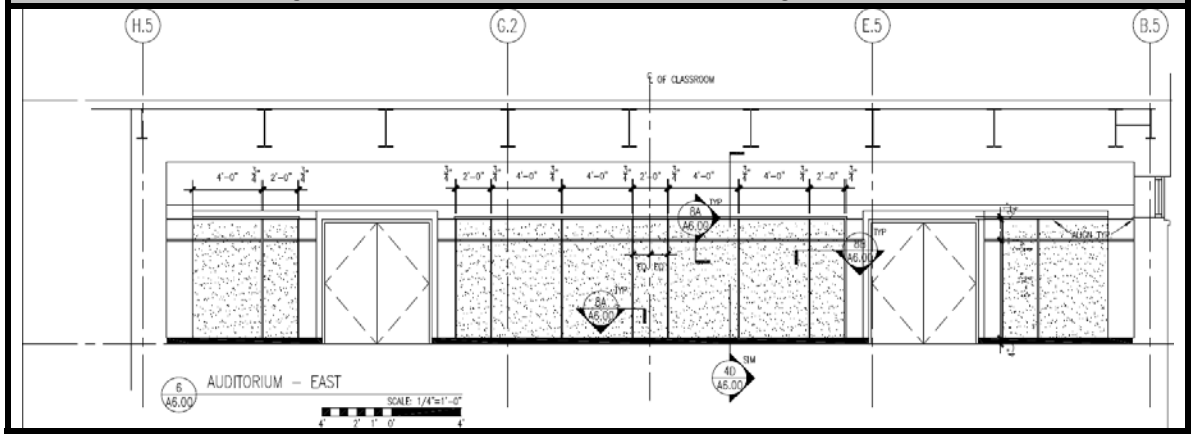
Peter & Ginny Nicholas Auditorium & Learning Center South Section



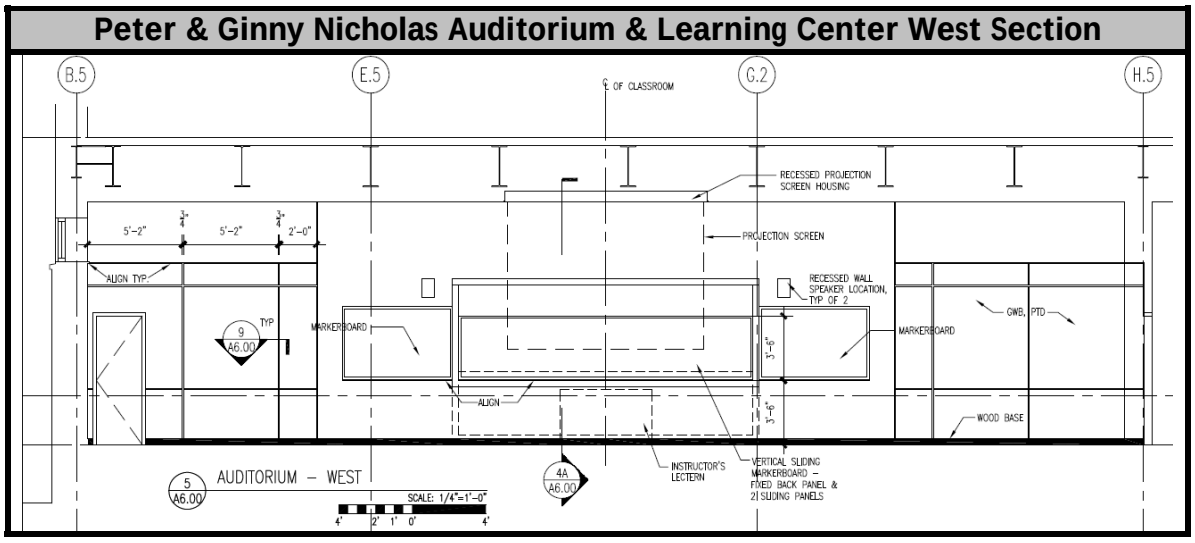
Peter & Ginny Nicholas Auditorium & Learning Center North Section



Peter & Ginny Nicholas Auditorium & Learning Center East Section



Peter & Ginny Nicholas Auditorium & Learning Center West Section



Peter & Ginny Nicholas Auditorium & Learning Center - Existing Conditions:

Surface Materials within the Space:

- Beige Thin Carpeting
  - Reflectance = 25%
- White Acoustic Ceiling Tiles
  - Reflectance = 80%
- Painted White GWB Ceiling
  - Reflectance = 85%
- Yellow Painted GWB
  - Reflectance = 60%
- Fabric Wrapped Acoustic Wall Panels
  - Reflectance = 38%
- Projector Screen
  - Reflectance = 50%

Other Materials within the Space:

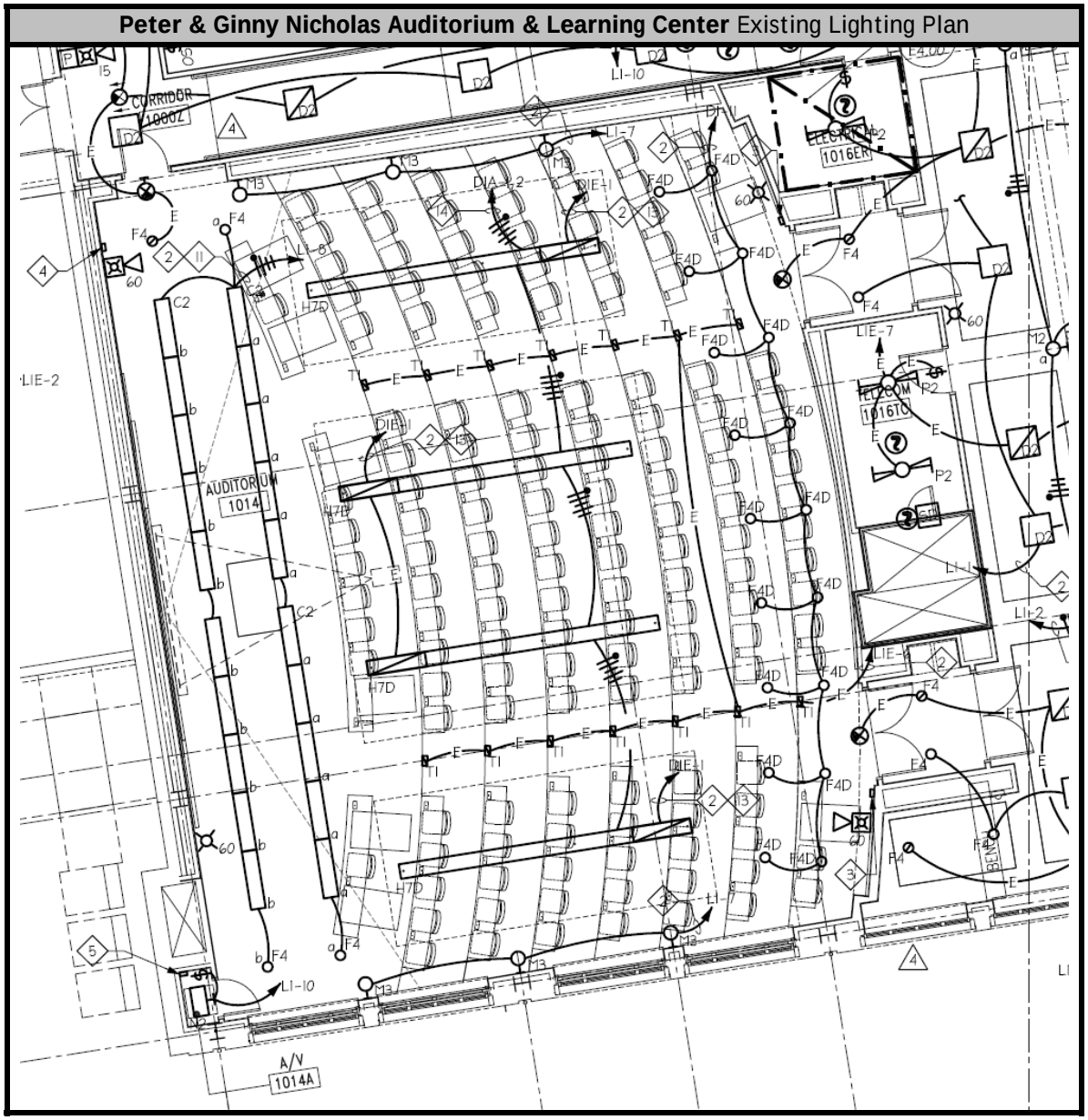
- Wood PLAM Desks
- Beige Fabric Covered Chairs

Glazing:

- **G-5 :** 1" Insulated Glass - Float
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

Peter & Ginny Nicholas Auditorium & Learning Center- Existing Lighting Plans:

Peter & Ginny Nicholas Auditorium & Learning Center Existing Lighting Plan



Peter & Ginny Nicholas Auditorium & Learning Center- Luminaire Schedule:

Peter & Ginny Nicholas Auditorium & Learning Center Luminaire Schedule						
Type	Mounting	Manufacturer	Catalog Number	Lamps	Volts	Description
C2	Ceiling Recessed	Metalux	EP3GX-232S18I-277	(2) FO32/835/XP/ECO	277	1X4 Parabolic 8-Cell
F4	Ceiling Recessed	Portfolio	C6132-E-6151-L1	(1) CF26DT/E/IN/835	277	6" Diam. Open Down Light
F4D	Ceiling Recessed	Portfolio	C6132-E-6151-L1	(1) CF26DT/E/IN/835	277	Same as F4 but with Lutron Dimming Ballast
H7D	Ceiling Pendent	Neoray	16DIP-3T5-24-SC-20FT-277-DS/DIM	(15) FP28/835/ECO	277	"EUROPA" Style Linear Direct-Indirect
M3	Wall Surface	Manning Lighting	LB-272-ADA-PT-BA-2F13-277-M1	(2) CF13DS/E/835	277	Wall Sconce with Perforated Metal and Acrylic
T1	Stair Recessed	Cole	F157-277-SCL	(1) CF7DS/835	277	Step light

Peter & Ginny Nicholas Auditorium & Learning Center- LLF:

Peter & Ginny Nicholas Auditorium & Learning Center Assumptions				
Type	IESNA Maintenance Category	Distribution Type	Environment Cleanliness	Cleaning Cycle
C2	IV	Direct	Clean	12 Months
F4	IV	Direct	Clean	12 Months
F4D	IV	Direct	Clean	12 Months
H7D	II	Semi-Indirect	Clean	12 Months
M3	II	Direct-Indirect	Clean	12 Months
T1	VI	Direct	Clean	12 Months

Peter & Ginny Nicholas Auditorium & Learning Center Assumed LLF					
Type	BF	LLD	RSDD	LDD	Total LLF
C2	0.95	0.93	0.97	0.89	0.76
F4	0.98	0.89	0.97	0.89	0.75
F4D	0.98	0.89	0.97	0.89	0.75
H7D	0.95	0.89	0.92	0.95	0.74
M3	0.89	0.84	0.92	0.95	0.65
T1	0.88	0.84	0.97	0.86	0.62

Peter & Ginny Nicholas Auditorium & Learning Center- IESNA Design Criteria

Appearance of Space and Luminaires

- The Peter & Ginny Nicholas Auditorium is intended to provide a studious atmosphere and the feeling of visual clarity, since it is a classroom. The space should also create a feeling of pleasantness to make the classroom an inviting place and a reduced institutional feel to the space. The luminaires in this space should provide a visually pleasing environment while maintaining a clean look.

Color Appearance

- The proper balance of color tone must be achieved to provide the sense of pleasantness while keeping a studious atmosphere and users of the space alert.

Daylight Integration and Controls

- The space has a series of four ribbon windows high on the west wall. This space has a projector and screen used by lectures to show presentations as well as videos. For this reason motorized shading of the windows must be considered for the daylight issues associated with projectors. The space is a classroom and meeting area and therefore requires flexible lighting and shading controls for the variety of activities that go on in this space.

Glare

- Direct glare from the luminaires should be considered to ensure that the space maintain a comfortable feel for the occupants. Also, direct glare from the sun should be avoided by installing the appropriate shading and controls for the windows. Reflected glare is also a great concern, especially on the whiteboards and the desk surfaces.

Light Distribution on Surfaces

- The space should maintain a rather uniform light distribution with some intentional scalloping or accenting on the back and side walls to provide a pleasant and inviting feel.

Light Distribution on Task Plane

- Considering the space is a classroom, visual clarity is of great importance. For this visual clarity, the task plane should have a uniform light distribution on it.

Modeling of Faces

- Being that the space is a classroom the point of focus is the professor or whoever is presenting before the class, modeling of faces is an important issue to address. Students who are able to see the eyes and facial expressions of a professor or speaker will naturally have a higher level of focus than if the face cannot be seen as well.

Points of Interest

- The main point of interest is the front of the room, which contains the lecturer, lectern, whiteboards, and projection screen. Therefore, this area must be appropriately lit for all these tasks to create the point of interest or focal point.

Shadows

- Shadows should be avoided except for the shadows created by the furniture.

Surfaces Characteristics

- The space contains a multitude of surfaces with varying characteristics. The desks are made of particle board covered with a wood plastic laminate. This is one of the most critical surfaces in the space since it may have a glossy sheen to it and therefore one must be cautious about glare. The other critical surface in this space is the surface of the whiteboards, since these have a high reflectance value to them. The other surfaces include carpeting; fabric wrapped acoustics panels; acoustic ceiling tiles; and painted GWB.

Source Task Eye Geometry

- Source task eye geometry must be considered since the space is a classroom. The location as well as the types of luminaires must be taken into consideration to reduce glare and veiling reflections.

Luminance of Surfaces

- Since the desks in the space are of a darker brown, the luminance ratio of the light color of paper to the dark color of the desks must be considered to achieve proper visual clarity.
    - 3:1 Task to Adjacent Background
    - 10:1 Task to Non-Adjacent Background

Other Issues

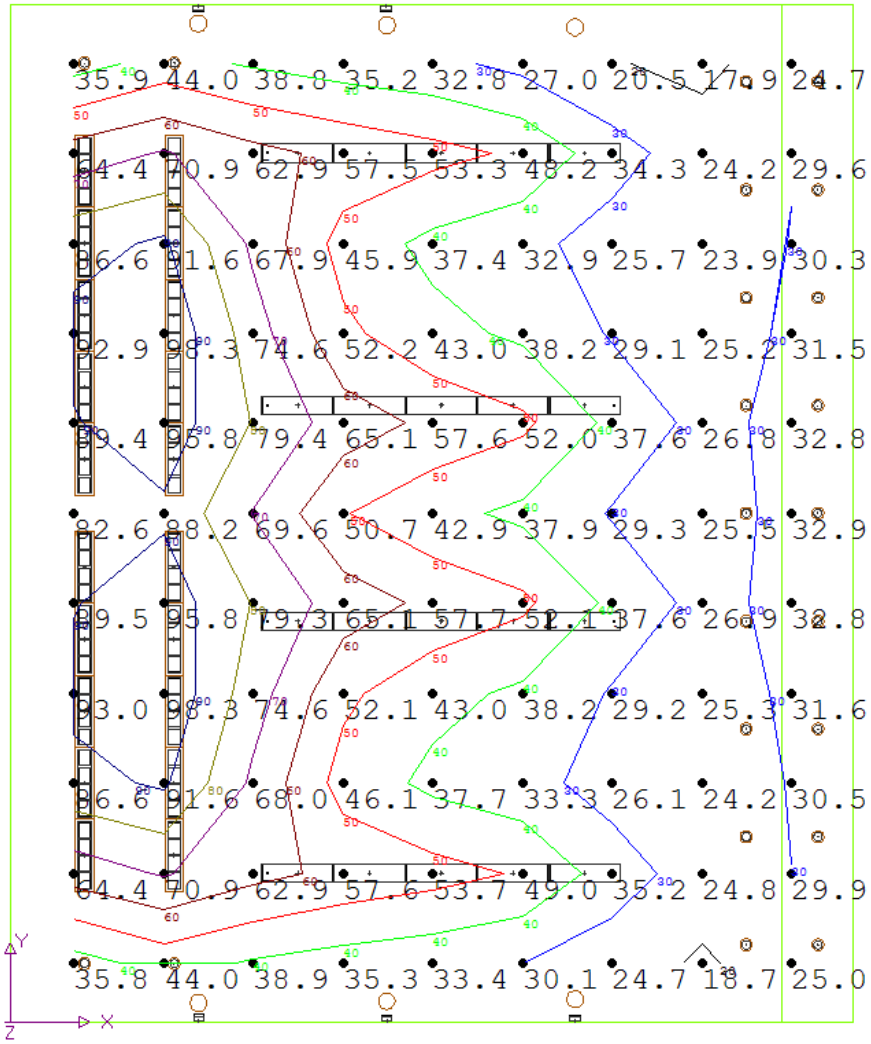
- The floor has a stepping effect to it and therefore this changes the level of the task plane, the desk surface, for every step made. This must be considered in the reading of the average horizontal illuminance.

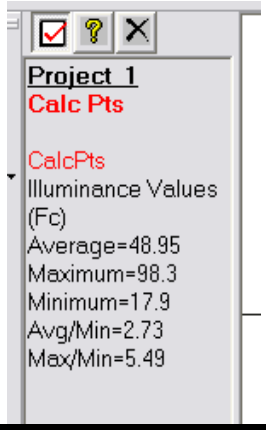
Illuminance (Horizontal & Vertical)

- IESNA recommends a horizontal illuminance of 1000 lx (100 fc) for an Educational Lecture Hall.
- IESNA recommends a vertical illuminance value of 500 lx (50 fc) for an Educational Lecture Hall.

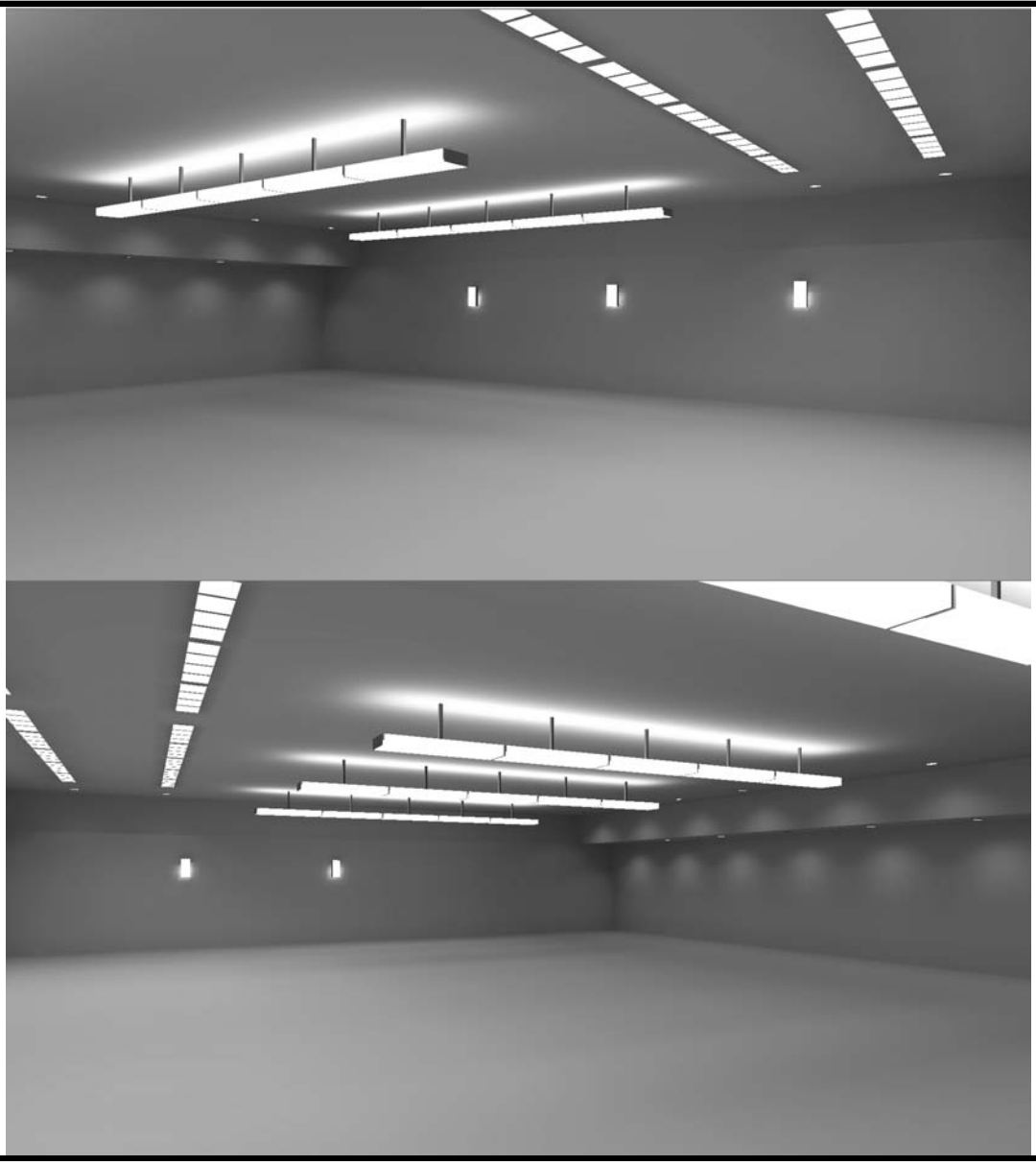
Peter & Ginny Nicholas Auditorium- Existing Lighting Calculations:

Illuminance Calculation Grid and Contours





AGI Renderings



Critique:

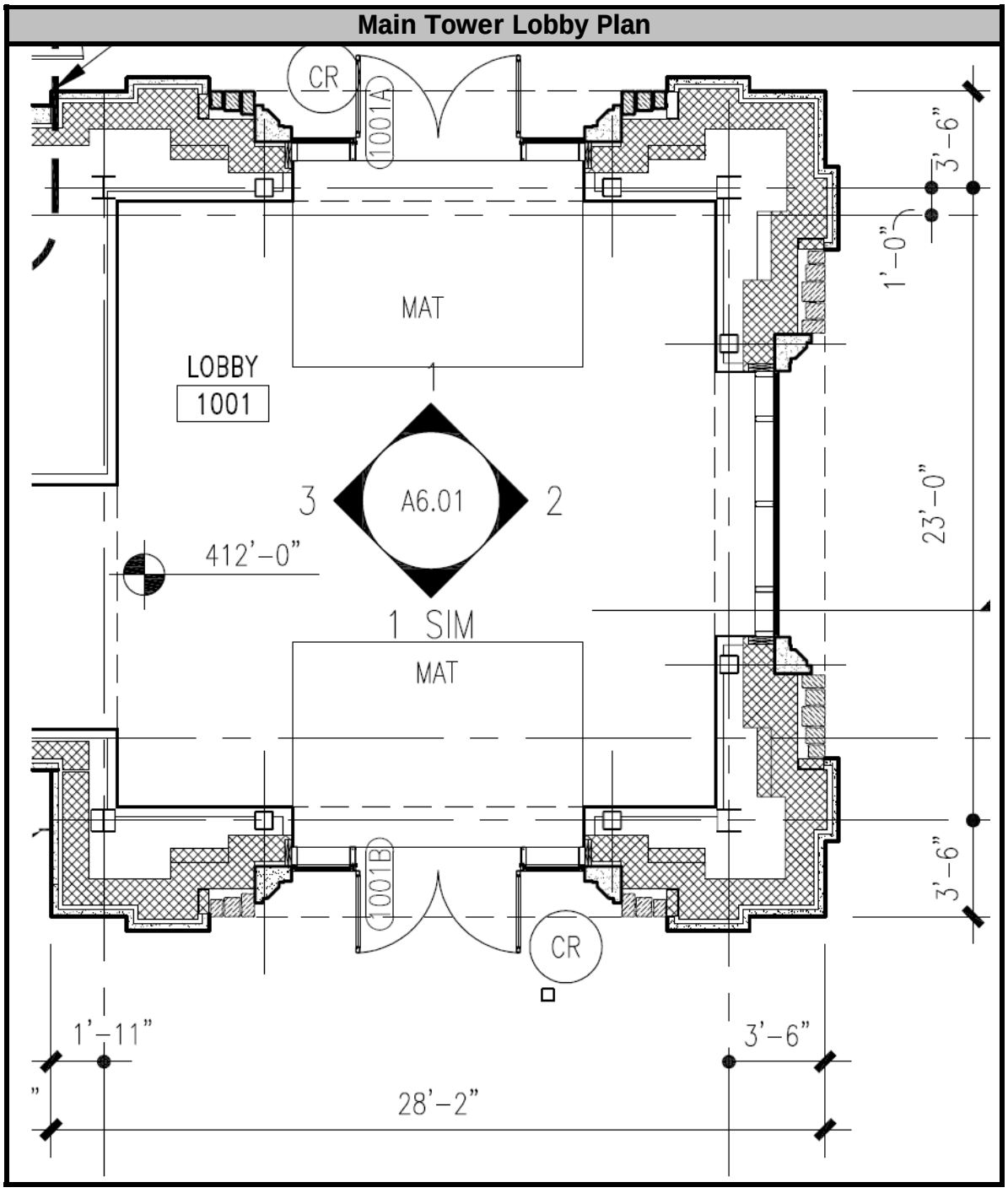
The auditorium is well designed in that it has the desired visual clarity feel to it while still maintaining a comfortable atmosphere. The control flexibility in this space well is prepared the handle the variety of functions that go on in this space. After performing the lighting calculations on the rough model of the space, the illuminance levels are approximately the recommended light levels of the IESNA Handbook.

Main Tower Lobby Overview:

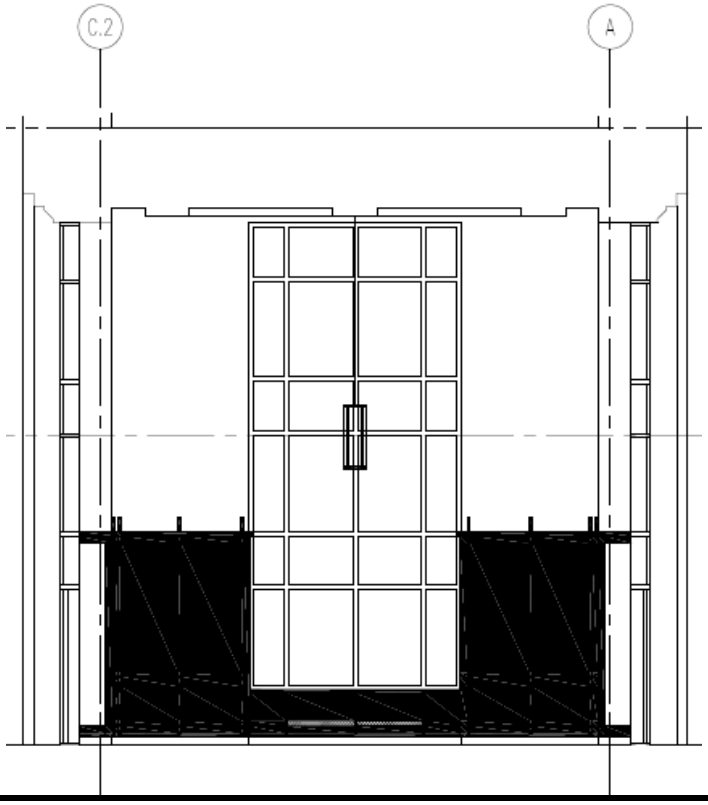
This is the main entrance to the building that is located in the prominent tower portion of the building. The floor of this lobby has the Duke School of Nursing emblem worked into the terrazzo flooring. This could be considered a grand entrance, since it covers an area of approximately 530 SF and is about 26 feet high with three full height glass curtain walls.

*The above are photo realistic conceptual renderings by ASG

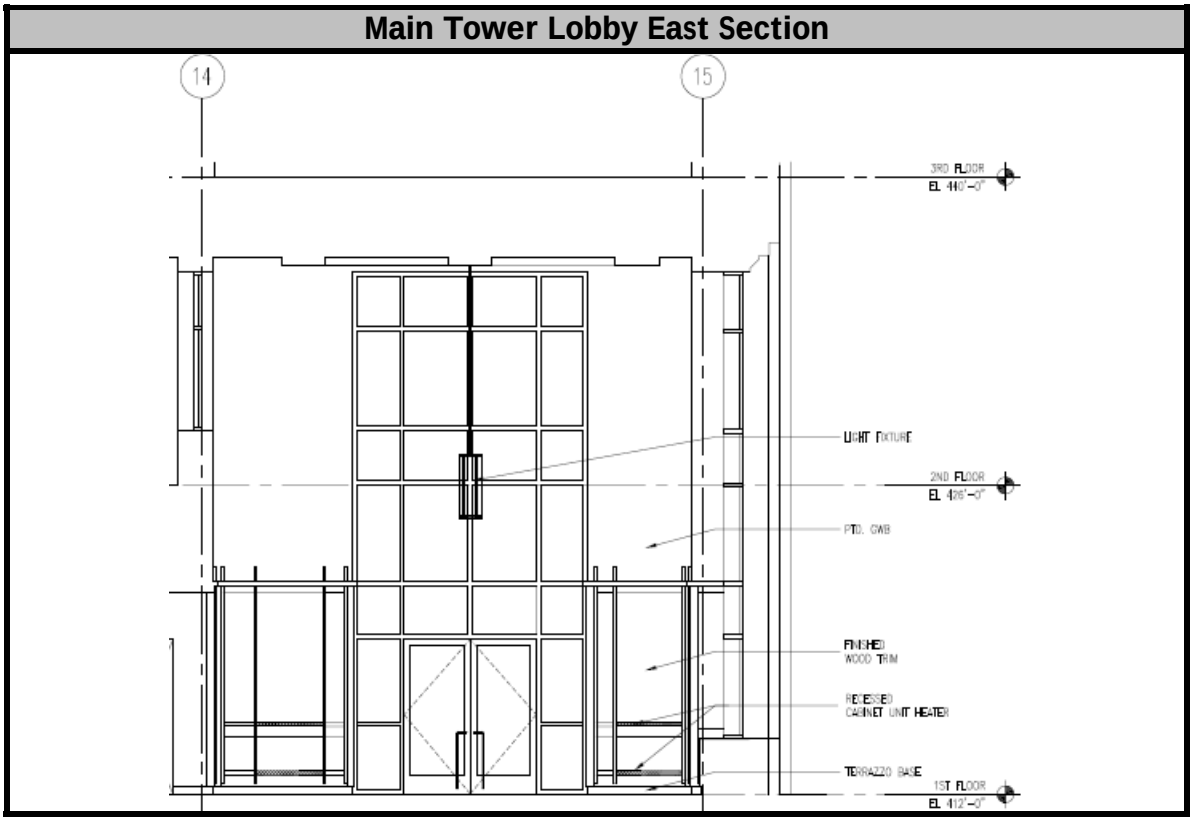
Main Tower Lobby Plan



Main Tower Lobby South Section



Main Tower Lobby East Section



Main Tower Lobby - Existing Conditions:

Surface Materials within the Space:

- Gray Terrazzo flooring
  - Reflectance = 43%
- White Acoustic Ceiling Tiles
  - Reflectance = 86%
- Painted White GWB Ceiling
  - Reflectance = 85%
- Painted White GWB Walls
  - Reflectance = 85%
- Wood Veneer Walls
  - Reflectance = 70%
- Wood Veneer Ceiling
  - Reflectance = 70%

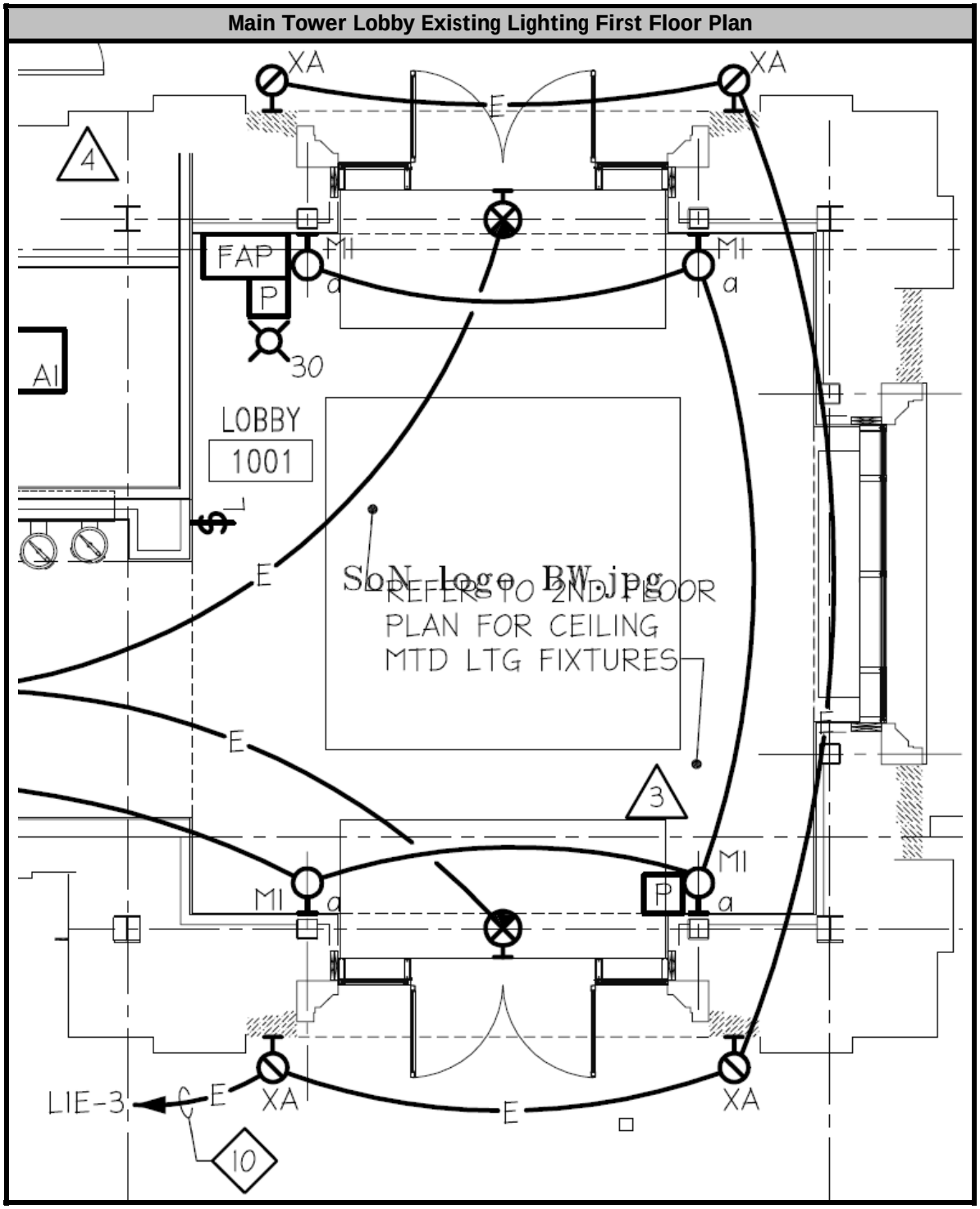
Glazing:

- **G-5 :** 1" Insulated Glass - Float
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

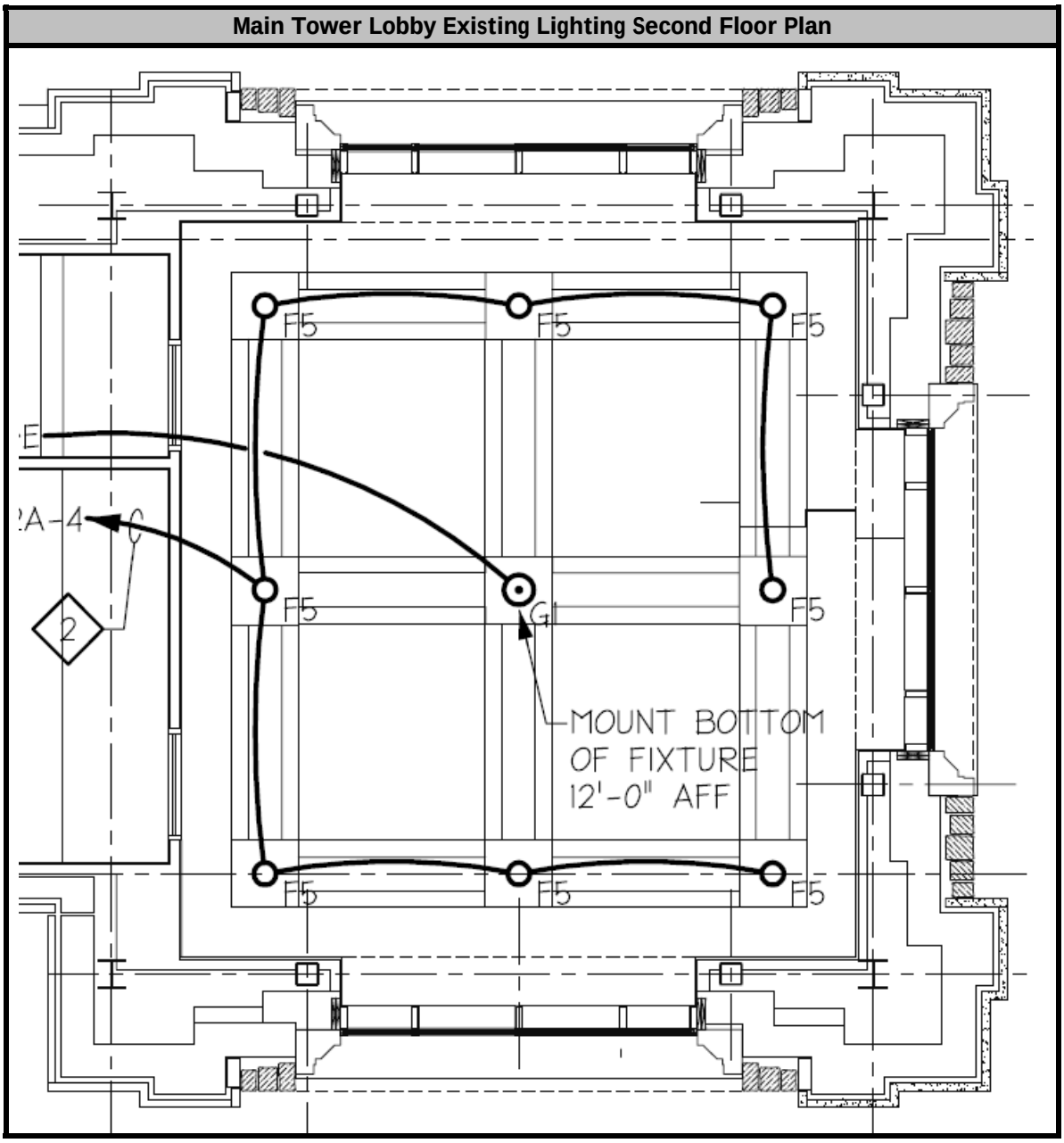
- **G-4 :** 1" Insulated Glass – Laminated (door glass)
  - U-Value = 0.57
  - Transmittance = 0.55
  - Shading Coefficient = 0.45

Main Tower Lobby- Existing Lighting Plans:

Main Tower Lobby Existing Lighting First Floor Plan



Main Tower Lobby Existing Lighting Second Floor Plan



Main Tower Lobby - Luminaire Schedule

Main Tower Lobby Luminaire Schedule						
Type	Mounting	Manufacturer	Catalog Number	Lamps	Volts	Description
F5	Ceiling Recessed	Portfolio	MD6-39-2E-6781-L1-1G	(1) Phillips CDM35/PAR30L /M/FL	277	6" Dia. Lensed Down Light with
G1	Ceiling Pendant	Shaper	M482-12x36-CFL/4/40-277-SAL-DM-HTB/VTB	(4) FT40DL/835	277	Matte Acrylic Cylinder Pendent
M1	Wall Surface	Shaper	673-T5/1/21-277V-SSS	(1) CF26DT/E/835	277	Half Cylinder Wall Sconce

Main Tower Lobby- LLF

Main Tower Lobby Assumptions				
Type	IESNA Maintenance Category	Distribution Type	Environment Cleanliness	Cleaning Cycle
F5	IV	Direct	Clean	12 Months
G1	IV	Direct	Clean	12 Months
M1	II	Direct-Indirect	Clean	12 Months

Main Tower Lobby Assumed LLF					
Type	BF	LLD	RSDD	LDD	Total LLF
F5	0.87	0.85	0.95	0.89	0.62
G1	0.98	0.83	0.95	0.89	0.70
M1	0.98	0.84	0.92	0.93	0.70

Main Tower Lobby- IESNA Design Criteria

Appearance of Space and Luminaires

- The space needs to appear inviting and carry a sense of grandeur, for this is the main entrance to the lobby. The luminaires should compliment the Gothic style of the building, since most of them are visible through the large glass windows of the Gothic tower.

Color Appearance

- The space should have warm color tones, in order for the space to have a warm and inviting feeling to it. Also, the color of the wood paneling will be enhanced by the warm color of light.

Daylight Integration and Controls

- The space is exposed to eastern, southern, and western sunlight by the three double high glass curtain walls. For this reason the use of photocell-controlled sensors or astronomical time clocks should be utilized for control of the fixtures.

Glare

- Direct and reflected glare from the luminaires should be considered to prevent seeing most of the fixtures in the glass and the terrazzo floor.

Light Distribution on Surfaces

- The space should maintain high uniform light levels on all the surfaces to help provide that sense of spaciousness and grandeur.

Light Distribution on Task Plane

- The space is a major thorough fair for the building and as a matter of public safety the task plane, floor, should have some degree of uniformity.

Luminance of Surfaces

- Being that the space is an entry lobby; the main goal is to lead the occupants to the corridor. By having a variable surface luminosities this can be achieved.

Points of Interest

- The main point of interest in the space is the Duke School of Nursing emblem worked into the terrazzo flooring.

Shadows

- Some shadowing is inherent with the sun tracking from east to the west throughout the day.

Surfaces Characteristics

- The space has wood wall paneling that with the proper lighting will enhance its beautiful characteristics. This wood paneling is contrasted by stark white walls above the wall paneling, and need to be considered so that they are not over lit. Finally, the gray terrazzo flooring needs to be properly lit to limit glare.

Illuminance (Horizontal & Vertical)

- IESNA recommends a horizontal illuminance value of 300 lx (30 fc) for a lobby.
- IESNA does not recommend a vertical illuminance value for a lobby.

Critique:

The entry lobby is a very interesting place, for it not only invites you when you walk through its large glass doors but also from the street. Since three of its walls are mostly glass, the interior is seen pretty well. For this reason the proper fixtures were chosen since they compliment the Gothic Tower which the lobby is incorporated into. The space appears to receive the proper amount illuminance from the pictures that I have seen.

ASHRAE/IESNA Standard 90.1:

Space-by-Space Method				
Space	Total Watts	Total Area	ASHRAE Allowed Lighting Power Density	Total Lighting Power Density
Courtyard	376	1450	0.2 W/sf	0.25 W/sf
Lounge	2224	1850	1.2 W/sf	1.20 W/sf
Auditorium	3708	2670	1.4 W/sf	1.38 W/sf
Entry Lobby	544	530	1.3 W/sf	1.02 W/sf