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RIT Fieldhouse and Activities Center
Rochester, NY
10/4/06
2 Space Design Report

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Summary

Concession Area:

The lighting in this space was designed to enable design goals that centered around 'attention getting' and 'positive appearance' from the customer point of view, and a cultivation of a sense of 'efficiency' from the supplier's perspective. The former had subcategories of cleanliness, creative accent lighting, and avoiding too much color which might have resulted in certain food products not looking as appetizing when not portrayed in their natural hues. The latter focuses more on proper light levels for expedient and safe working conditions. Design criteria that seem appropriate and worthwhile to keep in mind include attention to the appearance of colors, materials and surface characteristics, distribution of light on the task plane and surfaces, facial and object modeling, direct and reflected glare, and consideration of source/task/eye geometry.

To achieve the target light level of 50 fc on the service side of the concession area, a recessed parabolic fixture with energy efficient volumetric lighting was chosen. This fixture allows quite a bit of light to be emitted from a relatively low-energy luminaire, which is in accord with the design goals of the space. A wall mounted task light was also included over the counter area to illuminate directly the merchandise displayed or interaction taking place there, and to provide light on the vendors' faces. To enhance the concession area's appearance from the outside, the use of color LED striplights grazing the walls were employed in an effort to draw attention to the area. Additionally, the concession sign itself was illuminated by a backlighting LED system to further bring attention to this area.

Reflectances and Dimensions

The interior of the concession stand is approximately 26'x17'x14'(l,w,h) and the walls reflectances are assumed to be 0.75, 0.8, and 0.38 (w,c,f). The hallway outside the concession stand has dimensions of 53'x19'x18' (l,w,h) for the long leg and 17'x8'x18' (l,w,h) for the short leg. Both pieces of the corridor have reflectances assumed to be 0.5, 0.8. and 0.38 (w,f,c).

Equipment List

Concession Stand							
Luminaire Type	***Lamp Type***	***# of Lamps***	***Voltage***	***Ballast***	***BF***	***Input Watts***	***Controls***
FB2: Parabolic Recessed Troffer	F28T5	2	277V	GEB95 (included)	0.95	58 W	Manual Switching
FF6: Linear Fluorescent Direct	F28T5	1	277V	Electronic Class 'P' (included)	0.95	30 W	Manual Switching
LF1: LED Strip	LED	NA	277V	NA	NA	10	Switching by different area
FF7: Cross Baffle Linear Wallwash	F50BX	2	277V	EBTT Class 'P' (included)	1	41 W	Manual Switching

LLFs

Assumptions – all luminaries in this area will be denoted under the environmental dirt levels as "clean." The RCR for the L-shaped hallway was approximated by making the area one long hallway. Readings from the RSDD chart were approximated, not interpolated.

Parabolic Louver LLFs:
LLD = .94
LDD = .89
RSDD = .93
BF = .95

Total LLFs = .74

Linear Fluorescent LLFs:
LLD = .94
LDD = .87
RSDD = .97
BF = .95

Total LLFs = .75

LED Strip LLFs:
LLD = .95
LDD = .88
RSDD = .93

Total LLFs = .78

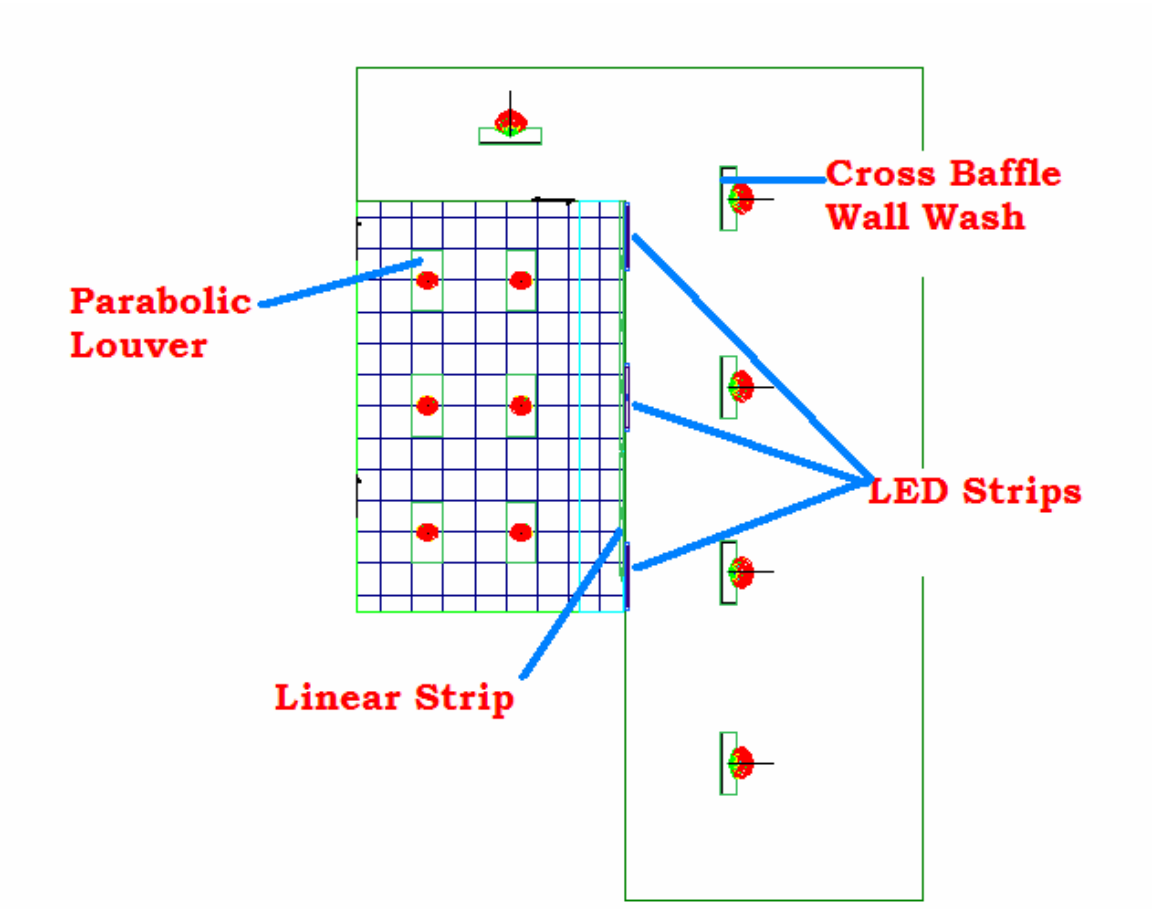
Cross Baflle LLFs:
LLD = .95
LDD = .90
RSDD = .94
BF = 1.00

Total LLFs = .80

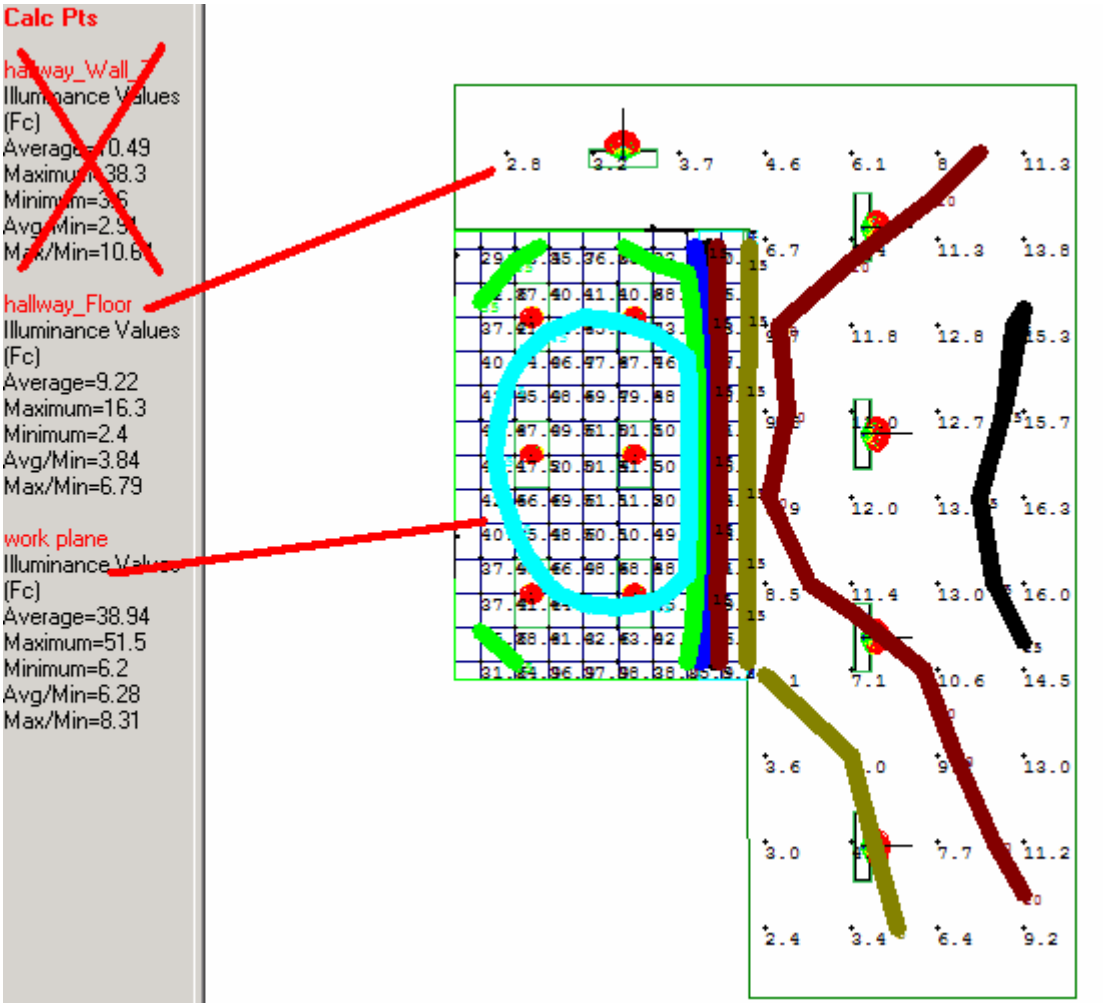
Power Densities:

Input Watts	*# of Luminaires*	*Associated Area*	*W/ft^2*
58 W	6	442 SF	0.79
30 W	6	442 SF	0.4
10 W	3	1007 SF (long leg only)	0.03
41 W	5	1143 (both legs)	0.18
		TOTAL POWER DENSITY:	1.4 w/ft^2

Luminaire locations and aiming



Lighting system performance evaluation (software output)

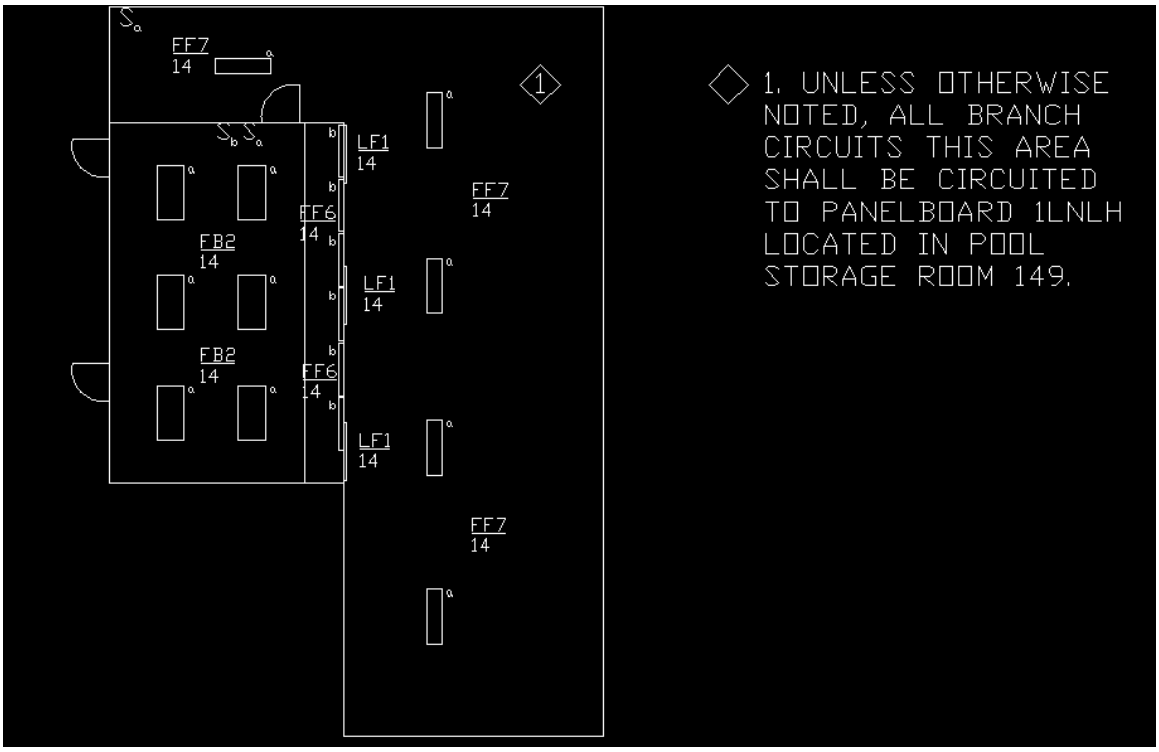


Renderings

There are no renderings included because at this time I don't believe that either of these two spaces will be used for my final "high quality" renderings.

Include a CD with computer files, or note where the files are located on a network drive.

Lighting Power Plan



Panelboard Information

"Old" Connected load for ckt 14 (Concession and Reception) = 3.4 KW
Lighting load contributed from Concession = 0.966 KW
(from tech 1, summation of fixtures in place)
Lighting load contributed from Reception therefore = 2.434 KW

"New" lighting to be connected to ckt 14: 0.763 KW
(summation of (input Watts * # fixtures) for the 4 fixtures, converted to KW)
"New" total Connected load for ckt 14 = 3.197KW

"New" feeder demand load = 52.5 KW (was 52.8 KW) – no change in wire/breaker/conduit size.

Tower:

The idea to redesign the lighting for the tower basically evolved from an exigence to light an outdoor space, but I choose the tower because most of the other areas I saw were beautifully lit for nighttime conditions. When I visited the site for a second time during the day, I noticed that up close the fixtures lighting the tower are clearly visible as you approach the main entrance. The engineer looked like he hardly took the time to conceal these fixtures, and they were quite an eyesore. After I inquired about this seemingly gross oversight, I was informed that the tower lighting structure had been completely assembled and mounted backwards, opposite the instruction in the drawings. So that explained why the fixtures were so obtrusive. I thought that this would be a great place to rectify this mistake as well as incorporate some catchy lighting design. I wanted to employ the use of color to enable a sort of dialogue between the community and what was occurring in the fieldhouse that night, be it a concert, a swim meet, a basketball game, or graduation. The other design goals I aimed for include to make an impact on the campus, as the Gordon Fieldhouse was commissioned to be a signature building on the RIT campus. I also thought about trying to address light pollution and nightlighting conditions (like dark sky), but abandoned these because the design of the tower simply doesn't allow for any of the lighting I envision to meet those very specific criteria. I did, however, want to make sure that my lighting design did not have the same luminaire visibility flaw as the existing design. To reinforce these goals, I based by lighting on design criteria including a strong focus on the appearance of color and materials, an even distribution of light across the tower's surfaces, and as little glare as possible.

Using these guidelines and goals, I treated the tower as a sculptural object, and decided to light it accordingly. The main focus of the design centered around using LED panels of color that could be changed to, again, let the viewers know what was going on inside the building, or simply create a unique technological sight for the campus of RIT when no specific colors were needed. The panels would be circuited together so the tube light LED luminaries would change colors together or cycle through a variety, depending on the owner's preference. The LED fixture is very versatile and is controlled by DMX, so many combinations are equally applicable as well as feasible.

Reflectances and Dimensions

The tower itself is comprised of 2" tempered glass sheets with white paint on one side, giving a semi-opaque quality to the light that would come through it. the transmittance of this glass is 0.79. The structure that supports the glass is an extrusion of face brick with a reflectance of 0.35. The glass panels are attached to the structure as well as connected to each other by aluminum tubing with a reflectance of 0.60. The glass panels with aluminum connections create the tower whose dimensions are 6' wide by 8' tall. The brick support is slightly smaller than this dimension.

Equipment List

Tower							
Luminaire Type	***Lamp Type***	***# of Lamps***	***Voltage***	***Ballast***	***BF***	***Input Watts***	***Controls***
T1: SaVI Tube architectural LED	LED	144 High Power LEDs	240VAC	NA	NA	58 W	SaVI TC240 – 240 V Controller

LLFs

Assumptions – all luminaries in this area will be denoted under the environmental dirt levels as "dirty." The RSDD for space doesn't exist, as it is an outdoor area.

SaVI Tube (LED) LLFs:
LLD = .94
LDD = .83

Total LLFs = .78

Power Density:

Input Watts	***# of Luminaires***	***Associated Area***	***W/ft^2***
21 W	16	96 SF	3.5

Luminaire locations and aiming

See lighting layout plan below.

Lighting system performance evaluation (software output)

Because this product does not have an associated IES file and I haven't been anle to find an equivalent yet, I am still working of creating my own IES file to model the performance of the luminaire. However, from the product information I am confident that the fixture will suit the purposes I have applied it to. I will include the data from AGI in the final report.

Renderings

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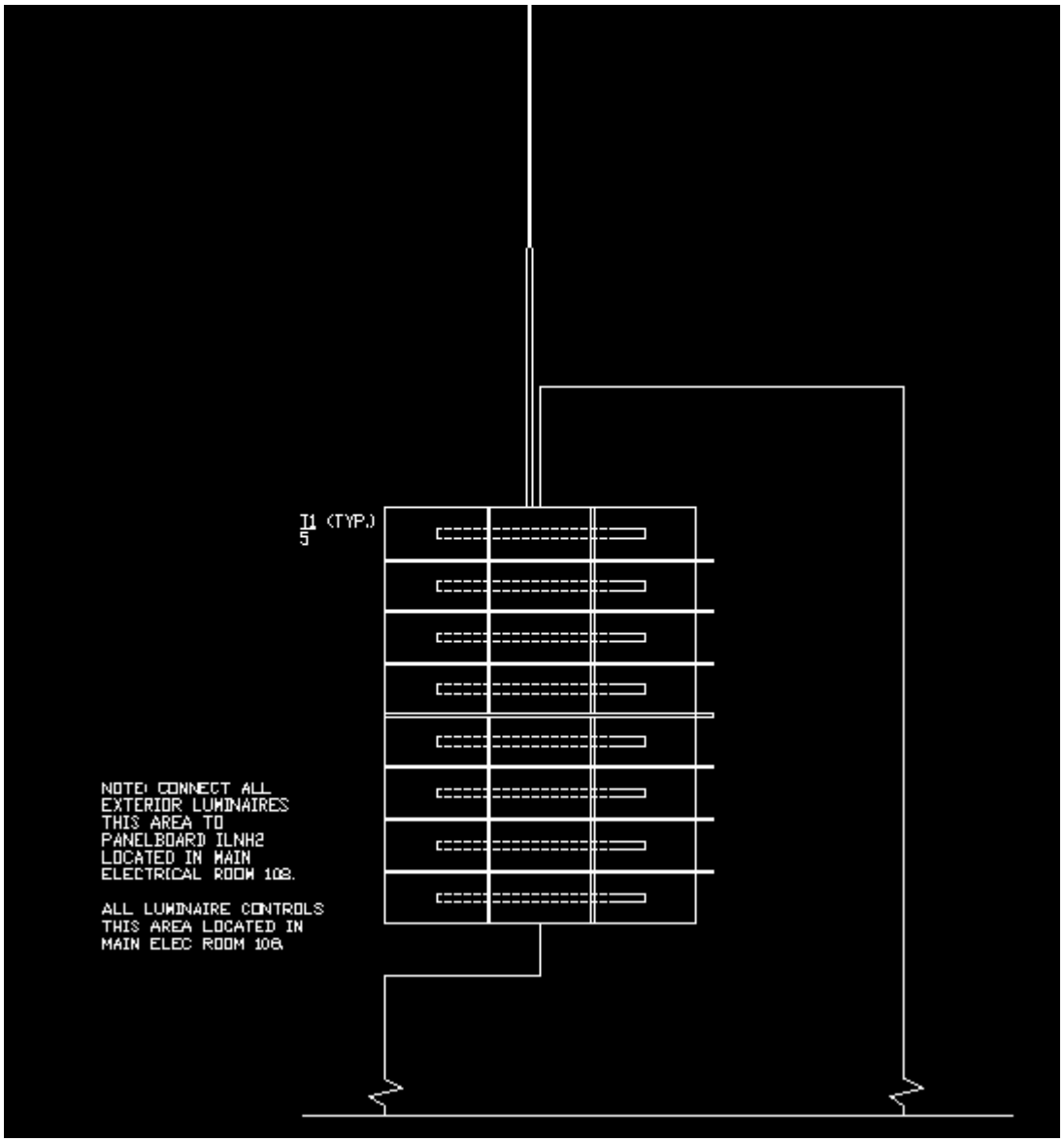
Lighting Power Plan:



Panelboard Information

"Old" Connected load for ckt 5 (Tower Lighting) = 3.6 KW

"New" lighting to be connected to ckt 5: 0.17 KW
(summation of (input Watts * # fixtures) for the 16 fixtures, converted to KW)

"New" feeder demand load = 16 KW (was 19.4 KW) – not a large enough change in wire/breaker/conduit size to redesign.

Please find extra documentation, including ies files, luminaire cut sheets, AGI files and panelboards on the Y drive under the folder entitled: "Schonour 2.16.07"