Hotel and Conference Center

Virginia, USA

Haley Darst
Lighting | Electrical
Faculty Advisor: Dr. Kevin Houser
October 4, 2010

Lighting Existing Conditions and Design Criteria Report

Relevant Computer Files :
P:\hld5013\Thesis

Executive Summary

The following report contains an analysis of the lighting design and associated systems in the Hotel and Conference Center in Virginia, USA. The Hotel and Conference Center embodies the notions of comfort and relaxation, especially through the use of light. Decorative luminaires and rich finishes help enhance the overall atmosphere of the building.

Detailed investigations in four completely different spaces in the building were conducted for future redesign. The four spaces include the main lobby (circulation space), the Lounge (special purpose space), exterior courtyard and façade (outdoor space), and the Ballroom (large work space). Finishes and reflectances are noted, as are special architectural features and the existing lighting systems for all of the spaces. Using recommendations from the IESNA Lighting Handbook and ASHRAE Standard 90.1, design considerations and criteria were determined for the redesign. The current solutions in the four spaces were also evaluated based on the quantitative and qualitative data. The Lounge and Ballroom were further analyzed using AGI32.

After evaluating the current lighting system in the Hotel and Conference Center, the systems generally do a very good job of lighting the different spaces and meet code standards. For the most part, the existing system seems to implement a great amount of design criteria. An overall impression of relaxation was apparent and was carried through from space to space using lamps with warmer color temperatures keeping direct light away from the guests and onto the peripherals.

Table of Contents

Building Information and Statistics

The recently opened Hotel and Conference Center, on the outskirts of one of the country's most respected universities, embodies the notions of comfort and relaxation with professionalism and academic success. The Hotel and Conference Center provides a luxurious and warm atmosphere to all patrons, whether residing in the hotel or merely attending a business or private event in the conference center. Although the exterior façade of the facility does not boast any discrepancies from the architecture of the university, the handsome interior spaces display the epitome of bringing the campus landscape indoors. Rich colors and woodwork dominate each of the spaces alike, reminding one of the outdoors and the campus setting which provided inspiration to the interior décor. The elegant inn houses 148 guest rooms, a lounge and bar area, a restaurant, ballroom, 24-hour fitness facility, and various meeting rooms in the conference center. Hotel guests not only become immersed in the sophisticated atmosphere, but are reminded of the spirit and vivacity of the university when visiting.

Building Name: Hotel and Conference Site

Location: Virginia, USA

Occupancy Type: Mixed Use – Hotel (R-1) and Conference (A-3)

Size: 174,000 SF

Number of Stories: 7 + 1 below grade

Dates of Construction: Fall 2008 - Summer 2010

Cost: $50 million

Project Delivery Method: GMP

Primary Project Team:

Owner: Information Withheld
Contractor: Balfour Beatty
Architect: Gensler
MEP Engineers: GHT Limited
Interior Designer: Gensler
Structural Engineers: Thornton Tomasetti and Abel Consulting Engineers
Civil Engineer: Christopher Consultants
Lighting Designer: Horton Lees Brogden Lighting Design
Landscape Architect: ParkerRodriguez
Fire/Life-Safety Consultant: Schirmer Engineering
Vertical Transportation: Lerch Bates & Associates
AV/Acoustics/IT/Telecom/Security: Cerami & Associates

Lobby | Existing Conditions

Description

Upon arrival at the Hotel and Conference Center, the Main Lobby serves as a particularly important space for guests and staff. Guests enter the main lobby through the vestibule and make their way to the front desk and check-in area. There are also seating areas throughout the main lobby, providing relaxation for guests and serving as waiting areas. These seating nooks are ideal for those waiting to enter either the Restaurant or Lounge. Floor to ceiling windows provide daylight into the space during the day. The lobby is filled with rich colors and finishes, complimenting the relaxing atmosphere.

Activities | Tasks:

- Check in at the front desk
- VDTs at the front desk for employees
- Lounging areas for guests
  - Reading
  - Socializing
  - Waiting for entrance to the Restaurant or Lounge
- Elevator lobby
- Passing through to Conference Center

Main Surface	Description	Tag	Manufacturer	Color	Reflectance
Ceiling	Overall Ceiling	P-12	Benjamin Moore	Vanilla Ice-Cream	0.87
	Dropped Ceiling	P-9	--	Chocolate Brown	0.01
Floor	Lobby rugs inset into wood flooring	C-3	--	--	0.14
	Porcelain tile in the Lobby and sundries; matte finish, 11.8"x23.6"x1/2"	PT-1	Lea/Ceramic Technics and Laticrete	Doral Gold and 85 Almond (II)	0.34
	Porcelain tile with matte finish	PT-1	Daltile	Gold and Al mond	0.34
Walls	Wall covering	WC-1	--	--	0.49
	Medite-FR wood paneling (48"x96") planks for spline walls, with a membrane film finish	WD-3	Interlam Inc		0.31
	Restaurant entry wall	P-15	Benjamin Moore	Cork	0.45
Base	Solid hardwood finish with semi-open pore lacquer and 30% sheen finish	WD-4	Danzer Specialty Veneer		0.03
Reception Desk	Solid hardwood finish with semi-open pore lacquer and 30% sheen finish	WD-6	GC to provide		0.03
	Desk top is 12"x12" Interior Stone (Granite) with polished finish, 3/4" thick and 1/16" max grout	ST-2	Daltile	G759-Golden Crystal	0.27
	Drawers and cabinets made of plastic laminate	PL-6	Pionite	Cressida Suede	0.07
	Wood veneer, sliced sapele with semi-open pre lacquer 30% sheen	WD-2	Dooge Veneers Inc		
Column Surrounds and Floor Accents	12"x12" Interior Stone (Natural Stone Collection), 1/2" to 1" thick and 1/4" grout	ST-1	Daltile	S783-Golden Sun	0.37
Front entry signage	Plastic laminate	PL-8	Chemetal	Brushed medium bronze aluminum	0.14
Woodwork	Wood veneer, sliced andes cedar with semi-open pore lacquer 30% sheen	WD-1	Danzer Specialty Veneer		0.24
Hostess Stand	Wood veneer, sliced sapele with semi-open pre lacquer 30% sheen	WD-2	Dooge Veneers Inc		0.06
	Solid hardwood finish with semi-open pore lacquer and 30% sheen finish	WD-6	GC to provide		0.03

Table 1: Materials and Reflectances | Lobby

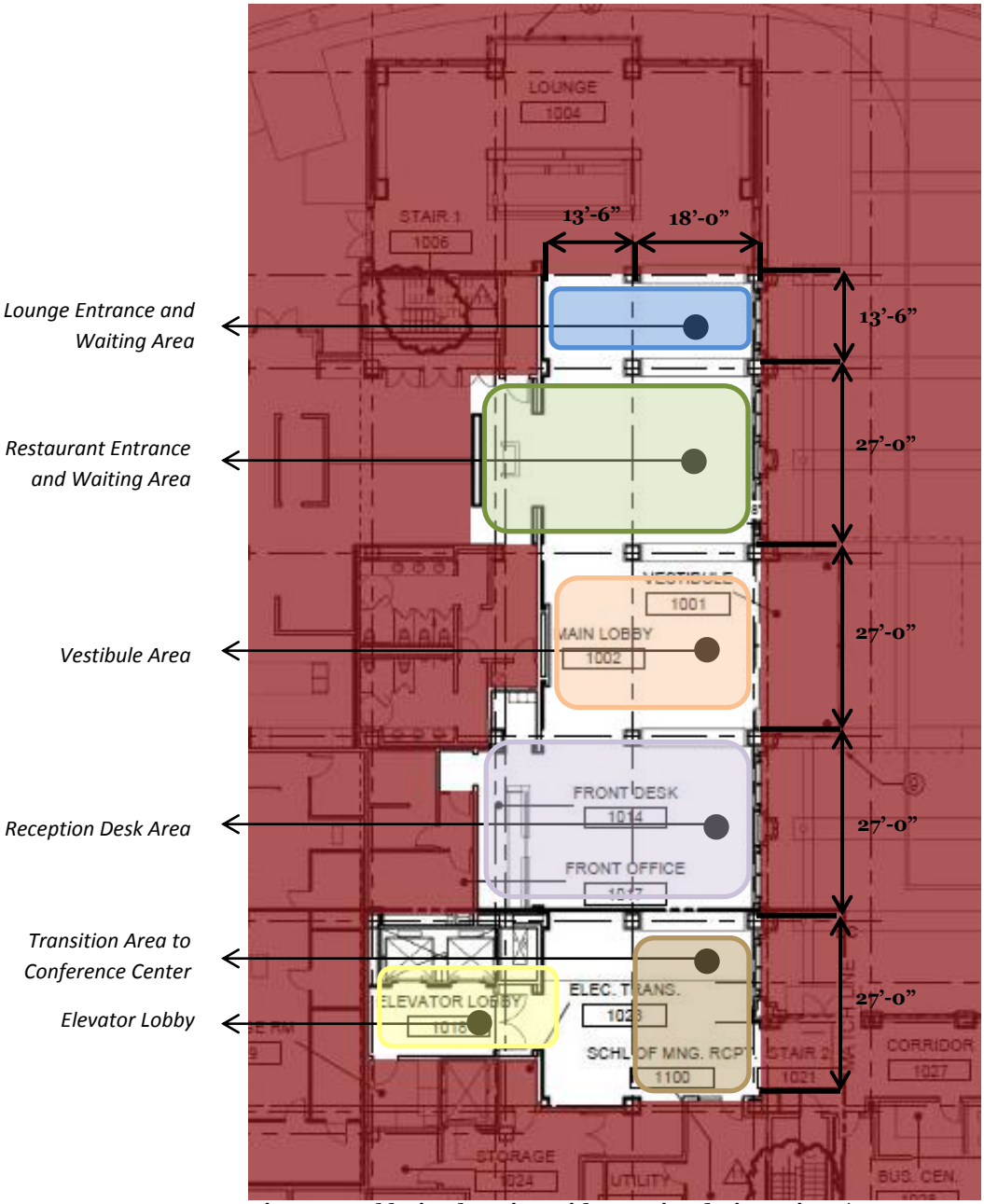

Figure 1: Lobby in Plan View with Associated Dimensions | NTS

Existing Room Conditions

Area: 4430 SF

Dimensions: Approximately 121'-6" x 36'-6", with a general ceiling height of 14'-0"; 1'-8" coves placed in the Restaurant waiting area, Vestibule area, Reception desk area, and the transition corridor to the

Conference Center; the ceiling height in the Elevator Lobby, above the Reception desk, and at the entrance of the Restaurant are all 9'-6"

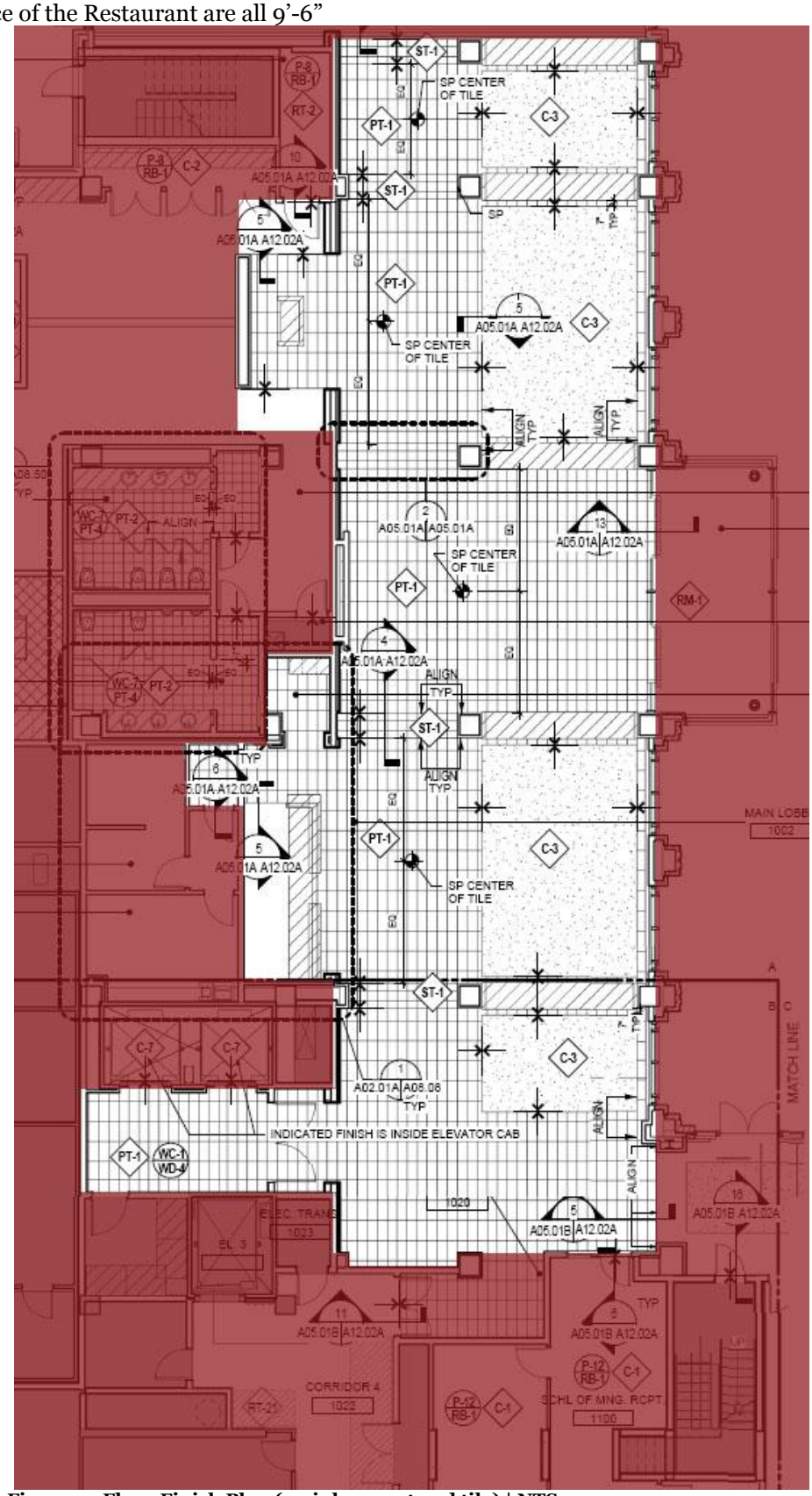

Figure 2: Floor Finish Plan (mainly carpet and tile) | NTS

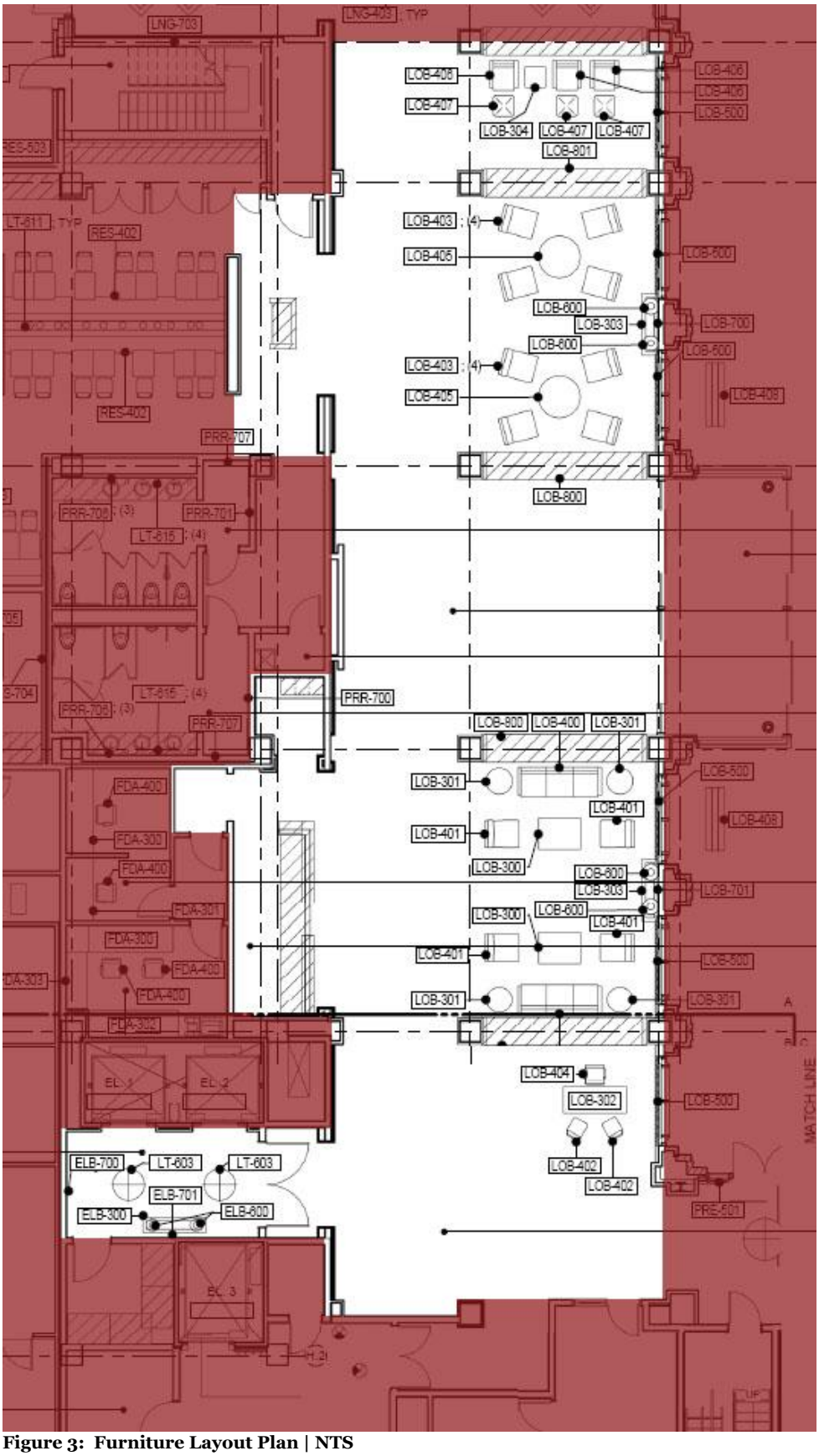

Figure 3: Furniture Layout Plan | NTS

Furnishings and Accessories:

Lavish furniture and finishes are abundant in the lobby. Wooden and tile built-in display cases separate the lobby into larger "areas": a Lounge waiting area, Restaurant waiting area, Vestibule area, Check-in and Reception Desk Area, and a transition zone to the Conference Center corridor with the Elevator Lobby off to the west. The shelving units also give an interesting 3-dimensional view of the different areas in the lobby and make the seating arrangements more private and relaxing. Neutral colors, such as deep chocolate browns, taupe, and burgundy are often used, complimenting the wood and porcelain tile finishes.

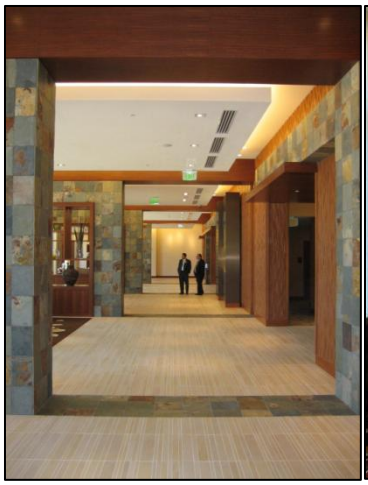

Figure 4: Lobby Corridor

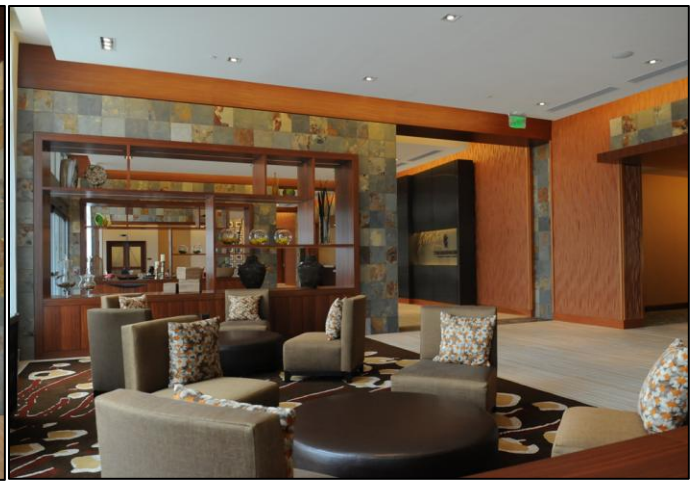

Figure 5: Seating in front of the Restaurant

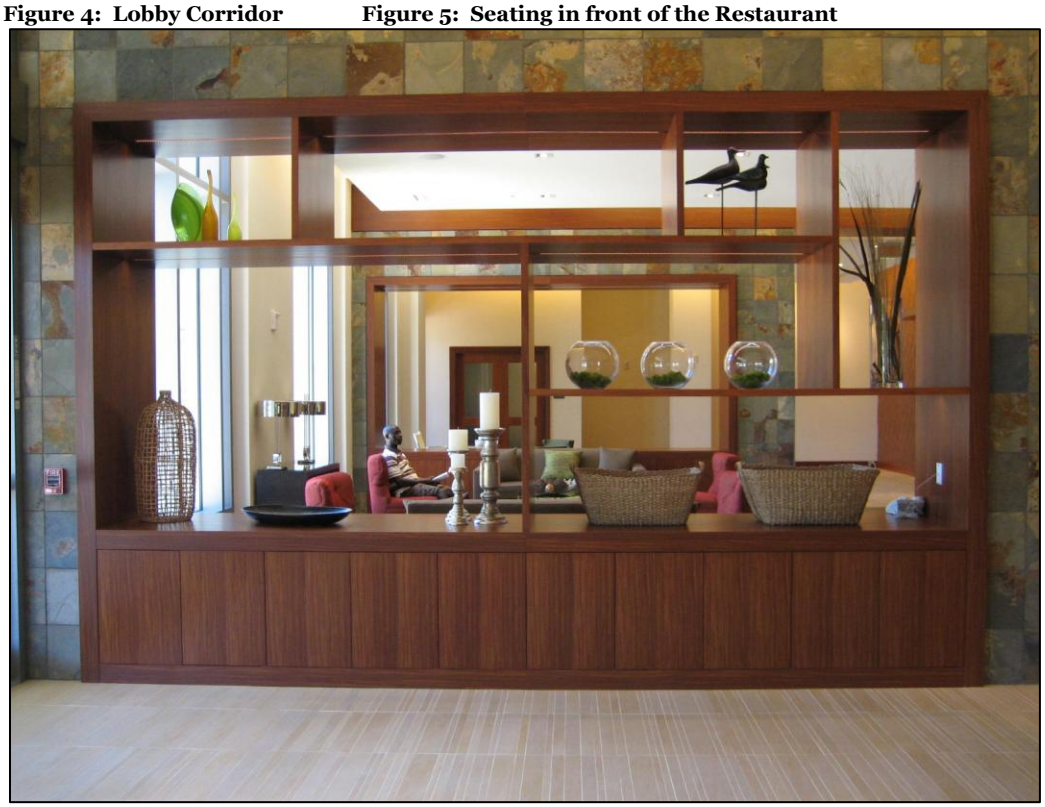

Figure 6: Built-in Display Case

Architectural Features:

The display cases described above are definitely an important architectural feature of the Lobby. But even more important are the way the Hotel and Conference Center decided to help orient and guide the guests throughout the building: through the use of branding walls that display important signage. There are four such branding walls in the lobby (note: only three are shown to conceal the Owner's identity).

As you step into the Hotel and Conference Center from the vestibule, the branding wall directly across from the entrance is an entry feature, displaying the name of the hotel. There is both an opaque and translucent graphic present on the wall with aluminum letters. The translucent graphic is backlit (note: not shown).

At the Reception Desk, there is also a branding wall present. This display is an illuminated graphic wall with a bronze finish operable glass door frame. The display is ½" tempered glass with a translucent digital vinyl graphic applied to the second surface. The actual image on display is of a path through Virginia woods and is also backlit.

Figure 7: Rendering of the Reception and Front Desk Area

Figure 8: Backlit Branding Wall

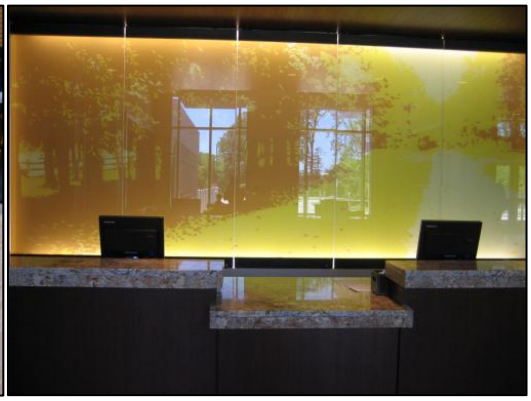

Figure 9: Backlit Display at Reception Desk

Walking along the Lobby to the Restaurant, another branding wall is present behind the hostess stand. This branding wall displays the Restaurant's name in aluminum letters mounted to the top of a lit signage cove.

Figure 10: Restaurant Entrance | Seen from Lobby

The entrance to the Lounge has a special, decorative display as well. 1" sandblasted cut acrylic letters mounted at the bottom of an interior fluorescent cove lighting channel showcase "Lounge". Rough finished and oxidized split rail fence members make up the central portions of the display.

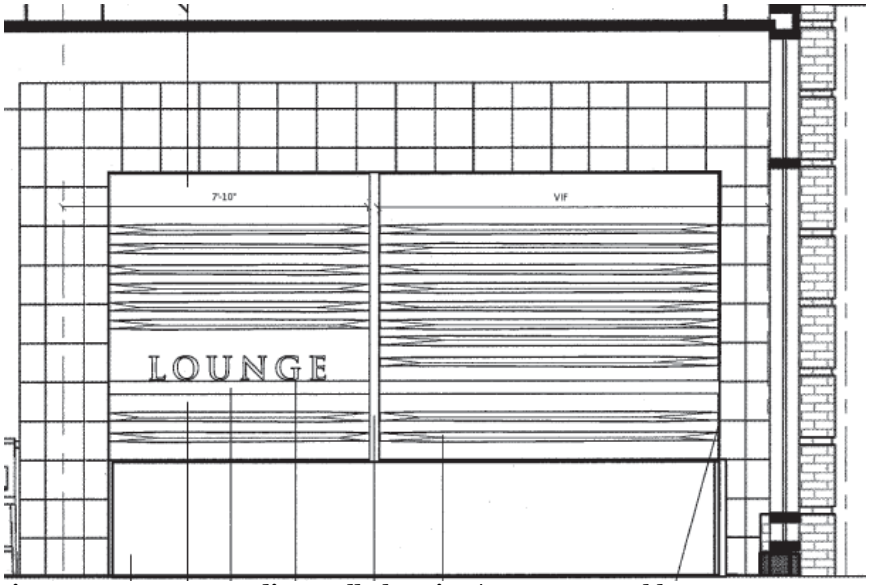

Figure 11: Lounge Branding Wall Elevation | Seen From Lobby

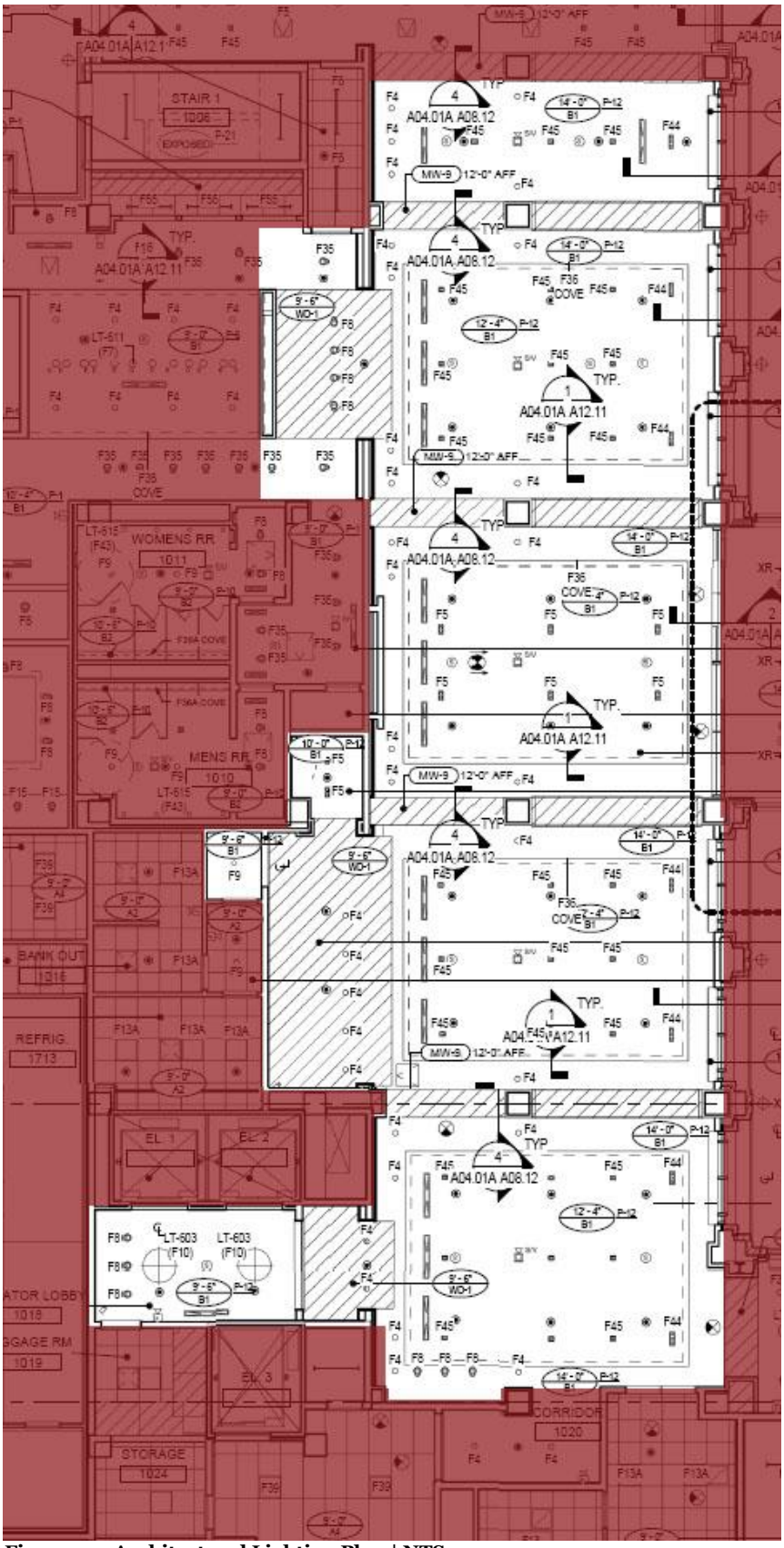

Figure 12: Architectural Lighting Plan | NTS

Lighting Layout and Equipment:

The lighting for the Lobby is very sophisticated and detailed. While recessed downlights provide ambient light, four large ceiling coves with accent lights give emphasis to the height of the space and further enhance the wooden millwork and porcelain tile finishes. LED striplights underneath the reception desk counter and in the display cases draw the eyes horizontally. Decorative pendants in the elevator lobby offer an interesting dimension to the smaller space. Backlit and cove-lit branding walls help orient guests throughout the main floor of the hotel. The majority of the lamps in the Lobby are halogen, although fluorescent, metal halide and LED are prominent as well. The lighting in the Lobby not only augments the rich colors and décor present in the Lobby, but becomes a centerpiece itself with its many applications into the architecture.

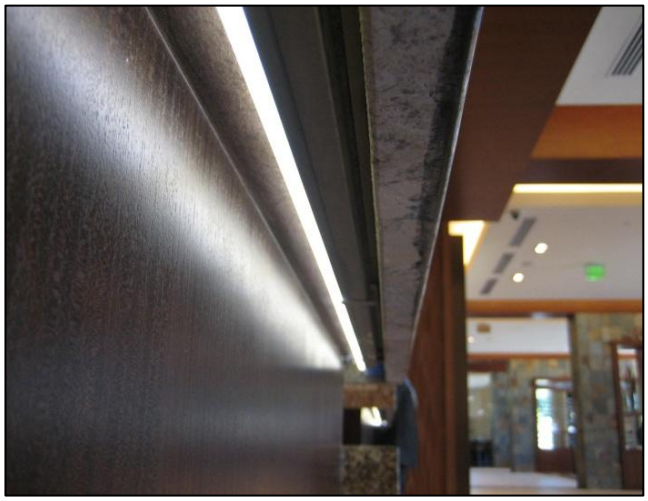

Figure 13: LED Striplight | Reception Desk

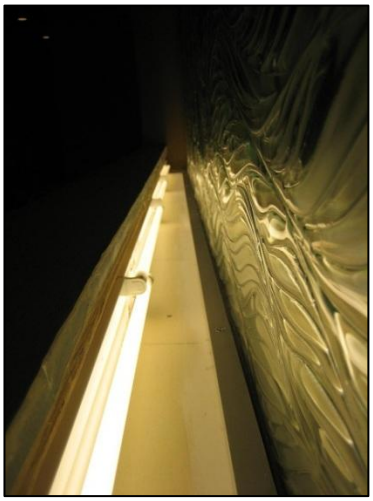

Figure 14: Fluorescent Cove Detail

Figure 15: Decorative Pendants | Elevator Lobby

Existing Luminaire Schedule | Lobby									
Fixture Type	Manufacturer	Description	Catalog No.	Lamps		Volts	Ballast	Mounting	Notes
				No.	Type				
F4	Lightolier	4" recessed halogen downlight with (1) MR16 35W max lamp	C4MRDWHW/C4LV-AFPF2-35W-MG8	1	FMV/FG/ULTRA Titan-35MR16NFL-18k hrs USHIO	120	--	Recessed	Lobby
F5	Lightolier	5" recessed halogen accent light with (2) MR16 37W max lamps	PB2M167EWL-AFWPF-35W-MG8	2	FMV/FG/ULTRA Titan-35MR16NFL-18k hrs USHIO	120	--	Recessed	Sundries
F5	Lightolier	6" recessed metal halide accent light with (2) 39W PAR30L lamps	PA2H3070**-MG8	2	35W PAR30L lamps	120	--	Recessed	Lobby
F8	Lightolier	4" recessed halogen accent light with (1) MR16 37W max lamp	C3MRAWHW/C3LVE*V-MG8	1	OSRAM 58634 37MR16NFL/IR/C-TITAN	120	--	Recessed	Lobby, Restaurant-EC to provide labor to focus fixture under direction of lighting consultant
F9	Lightolier	7" recessed compact fluorescent downlight with (1) CFTR26W lamp, white parabolic reflector	8037WHW/713BU 26W-MG8	1	F26TBX/SPX30 G.E.	277	--	Recessed	
F10	Stonegate Designs	Elevator Lobby surface mounted decorative fixture	Coco Small Pendant	4	F26TBX/SPX30 G.E.	120	Integral HPT Electronic	Surface	Elevator lobbies-first floor only
F30	iLight	Surface mounted linear warm white LED encased with frosted PVD flexible housing with remote power	T-24V-*28-S-CI-SC	1	1-2800K LED 5W/LF	120	Remote power supply	Surface	Registration and Lounge Counters
F36	Lightolier	Surface-mounted fluorescent strip light, rigid housing with (1) F32T8 lamp	SS-4-S-1-32-JO;I,E-,G8	1	F32T8/SPX30 G.E.	120	Integral HPF Lutron HILUME	Cove	Lobby - Contractor to coordinate mounting in coves
F42	Acolyte	Surface mounted linear white LED striplight with standard 2-prong plug for 120V power	STL23AC-3500K/STL50AC-3500K	-	LED	120	--	Surface	Provide receptacle for power. No hard wired power supply required.
F44	Lightolier	Recessed 3-lamp MR16 adjustable accent light with integral 12V transformer	PA3M167EWL-AFPF2-LENS-37W LABEL-MG8	3	37 MR16 NFL/IR/C-TITAN	120	--	Recessed	Lobby
F45	Lightolier	Recessed single lamp MR16 adjustable accent light, nominal 5" square aperture, integral transformer	PA1M67EWL-AFPF2-LENS-37W LABEL-MG8	1	37 MR16 NFL/IR/C-TITAN	120	--	Recessed	Lobby

Table 2: Existing Luminaire Schedule | Lobby

Daylighting Elements:

The majority of the daylight entering into the Lobby comes from the glazing on the east. Floor to ceiling glazing across this façade spans almost the entire length of the space. A preset dimming system is in the Lobby, providing lower level lighting during "off" hours when the hotel is still open but less active.

Control Devices:

The lobby is equipped with a dimming panel controlling twenty-four zones and four preset scenes.

Figure 16: Photograph of Lobby Lighting at Night

Figure 17: Photograph of Lobby Lighting at Night

Lobby | Design Considerations and Criteria

Lighting Design Criteria and Considerations

(IESNA Lighting Handbook – Interior > Hotels > Lobby > General Lighting and Front Desk)

- **Psychological Aspect:**
  The Lobby is the space where guests develop their initial impression of the hotel. Therefore, the lobby should create a warm and welcoming atmosphere. The Lobby should also be relaxing for all of the guests, as they may be waiting to go into the Restaurant or Lounge.

- **Appearance of Space and Luminaires:**
  Because the Lobby sets the tone for the rest of the Hotel and Conference Center, an inviting ambiance is wanted. The lighting design should complement the wood millwork and rich finishes and colors in the Lobby. Luminaire selections in the Lobby contribute to maintaining a welcoming and relaxing atmosphere.

- **Color Appearance and Color Contrast:**
  The gold, taupe, chocolate brown, and off-white hues in the Lobby should be enhanced by warm light. Lamps with warmer CCTs ought to be used to stimulate a relaxing atmosphere by keeping light levels low and enhancing the richer colors. Since the Lobby has distinct seating areas for guests, color appearance is important for reading.

- **Reflected Glare:**
  Because of the glossy surfaces of the reception desk and some of the table tops in the reading areas, reflected glare could be a potential risk for guests. Transactions between the receptionists and guests at the main desk involve money and paperwork and reflected disability glare would be a distraction. Guests reading in the waiting areas would also experience glare on the tables.

- **Modeling of Faces or Objects:**
  At the front desk, visual appearance of the receptionist and guests is imperative for transactions to take place. In general, the light levels at the main desk will be higher than the rest of the Lobby. Lamps with high CRIs (greater than 80) will generate warm skin tones much more naturally and should be utilized. Having the receptionist at the front desk appear welcoming and friendly will in turn create happier guests staying at the Hotel and Conference Center.

- **Daylighting Integration and Control:**
  Floor to ceiling glazing on the east façade of the Lobby provides the space with plenty of daylight during the day in the summer months. However, in the winter, the sun will not shine directly into the windows and the building may even lose heat during this time. Integrating a dimming system in the Lobby would be ideal as to provide energy savings during daylight hours. Having lower light levels during the evening would help promote the relaxing and comforting atmosphere and mood of the space. When the hotel is open but not as active, a dimming system could be utilized to further decrease the light levels.

- **Direct Glare:**
  In a space with a relaxing atmosphere, decorative luminaires should not be the only sources of light as they may appear “glary” to guests reading and relaxing in the seating areas of the Lobby. Direct glare should be avoided at all costs as it will make guests feel tense and will distract them from the rest of the space. Direct glare in the entrance canopy should also be avoided as guests are entering from outside and their eyes need to adjust to the light levels inside.

- **Light Distribution on Surfaces:**
  The Lobby can be split up into six distinct zones (see Figure 1) horizontally. Each of these areas has its own purpose, and some overlap. The waiting areas for the Lounge, Restaurant, and Reception Desk all have strong relationships with the furniture present, so light levels can be more or less around furniture surface height. In the Vestibule Area, Elevator Lobby, and Transition Corridor to the Conference Center, getting to and from one spot to another is the most important task. Therefore, the lighting on the floor and walls should help orient guests to their designation. The Reception Desk's main focal point is the actual desk itself and should therefore act as such. In general, the Lobby should have non-uniform lighting vertically as this promotes a more relaxing atmosphere.

- **Points of Interest:**
  The branding walls throughout the Lobby not only orient guests, but provide visual interest because they are so large in size and dimension. By implementing back lit glass, cove lighting, and grazing textures, the architectural details can stand out to guests and reveal and transform the space. Artwork on some of the walls can also be accented. The seating areas are also an important feature, making dividing the Lobby into more intimate spaces for conversation and reading.

- **Luminances of Room Surfaces:**
  Finishes in the Lobby consist of expensive porcelain tile and custom millwork. Consideration of the luxurious surfaces of the furniture and warm, neutral colors must be included when designing the lighting system.

- **Horizontal Illuminance:**
  - General lighting is suggested to be in Category "C", **10fc**. The recommendation seems practical as people will mainly be passing through the lobby and sitting in the waiting areas.
  - At the front desk, the IESNA Handbook suggests Category "E" at 50fc. I plan on deviating from this recommendation and producing a solution at **30fc** instead, because I think if the rest of the space is lit at 10fc, the front desk will still remain a focal point at three times the illuminance.

- **Vertical Illuminance:**
  (No recommendations noted)

- **Power Density Allowance: ASHRAE 90.1.2007**
  - Lobby | For Hotel: 1.1 W/SF
  - Additional Interior Lighting Power – In addition to the installation of general lighting, decorative lighting is permitted (chandeliers, sconces, or for highlighting features) as long as it does not exceed 1.0 W/SF.
  - Total allowable = **2.1 W/SF**

Lobby | Evaluation and Critique

The Lobby in the Hotel and Conference Center definitely evokes a naturally warm and inviting environment for guests by generally keeping light on the peripherals and directly away from the occupants. Four coves in four distinct areas of the Lobby give off ambient light and keep the light levels low on the floor. The backlit branding walls and cove lighting detail help orient and direct guests throughout the entire hotel by distinctly featuring the names of the areas. This also helps take light off of the guests and onto accented features throughout the Lobby, creating a relaxing atmosphere and drawing attention to the light/artwork. LED strips mounted on the reception desk and into the display case form linear bands of light, much like the cove lighting. Recessed halogen downlights create pools of light on the floor and also break up the linearity of the layout.

Overall the layout seems efficient and pretty typical. Each "area" of the Lobby has its own lighting, and they are very much linked and related to each other. Regularly spaced recessed accent lights and cove lighting create the natural "areas" of the room. Downlights are utilized over the main areas of the Lobby, such as the reception desk and Restaurant entrance, drawing guests' attention to the more important areas of the Hotel with high illuminances. The color and texture of the pendants in the Elevator Lobby mirror those in the rest of the space with its neutral colors and fine finish.

The halogen lamps utilized produce a warmer feel in the Lobby, adding to the tone of relaxation. The color temperature is appropriate with the rest of the space. Warm white LEDs were even used to complement the warm colors of the halogen lamps. Warmer CCTs were definitely a consideration in the lighting design, as they had impact on the finishes and colors in the Lobby.

The lighting power density met ASHRAE 90.1 2007 standards (refer to Table 4 below).

Light Loss Factors
**Use of the new procedure to find LDD was used. As the new handbook does not address RSDD, it was not calculated below. According to the new handbook, a LEDs LLD is assumed to be 0.7. A 12 month cleaning interval and "clean" environment was assumed. Any other LLFs not displayed are assumed to be 1.0.*

Light Loss Factors | Lobby				
Fixture Type	LLD	LDD	BF	Total LLF
F4	0.88	0.94	--	0.83
F5	0.88	0.94	--	0.83
F5	0.82	0.94	1.00	0.77
F8	0.88	0.94	--	0.83
F9	0.85	0.94	0.87	0.70
F10	0.85	0.94	0.87	0.70
F30	0.70	0.94	0.80	0.53
F36	0.95	0.94	0.87	0.78
F42	0.70	0.94	0.80	0.53
F44	0.88	0.94	--	0.83
F45	0.88	0.94	--	0.83

Table 3: Light Loss Factors | Lobby

LPD | Lobby				
Fixture Type	**Quantity**	**Watts/Luminaire**	**Watts/LF**	**Total Watts**
F4	32	37	-	1184
F5	6	37	-	222
F5	2	37	-	74
F8	6	37	-	222
F9	1	26	-	26
F10	2	26	-	52
F30	20 LF	-	5	100
F36	96	32	-	3072
F42	72 LF	-	2	144
F44	7	37	-	259
F45	25	37	-	925
			Total Watts	6280
			Total W/SF	**1.42**

Table 4: LPD | Lobby

Lounge | Existing Conditions

Description

The Lounge in the Hotel and Conference Center is a more private space in the hotel for customers. It is a space separated from the rest of the hotel where guests can enjoy fine food and spirits at the bar during the late afternoon and evening hours. Situated on the northernmost part of the building, floor to ceiling glazing spans almost the entirety of the façade, allowing daylight into the space. Guests of the Hotel and Conference Center can enter the Lounge through the main lobby and corridor on the first floor. A set of double doors on the western wall provides access to the outdoor terrace.

Activities | Tasks:

- Dining
- Drinking
- Socializing
- Bartenders/Servers
- Guests watching television or reading

Main Surface	Description	Tag	Manufacturer	Color	Reflectance
Ceiling	Overall Ceiling	P-5	Benjamin Moore	Desolate	0.81
	Dropped Ceiling Canopy	P-9	PPG	Classic Brown	0.01
Floor	Radiata Pine wood flooring with a clear finish; planks are 4.25" wide	WF-1	Gammapar	Cohiban	0.43
	Area rug inset into the wood flooring	C-4	--	--	0.25
	Beige 6"x6" quarry tile with a matte finish behind the bar	QT-1	Daltile	Gold and Almond	0.34
Base	Solid hardwood with a clear finish	WD-5	GC to provide		0.03
	Bar Wall base	P-9	PPG	Classic Brown	0.01
Bar	Wood veneer, walnut/semi open pre-lacquer with 30% sheen paneled barface	WD-2	Dooge Veneers Inc		0.06
	Polished granite bar top , 3/4" thickness with 1/16" max	ST-3		Verde Butterfly "M"	0.09
	Plastic laminate lounge bar	PL-5	Formica	Black	0.00
	Solid hardwood finish with semi-open pore lacquer and 30% sheen finish	WD-6	GC to provide		0.03
	Plastic laminate back bar	PL-1	Chemetal	Antiqued brushed brass	0.05
Bookcases	High-gloss lacquer	P-4	Sherman Williams	Weather Vane	0.05
Walls	Wall covering	W-6			0.85

Table 5: Materials and Reflectances

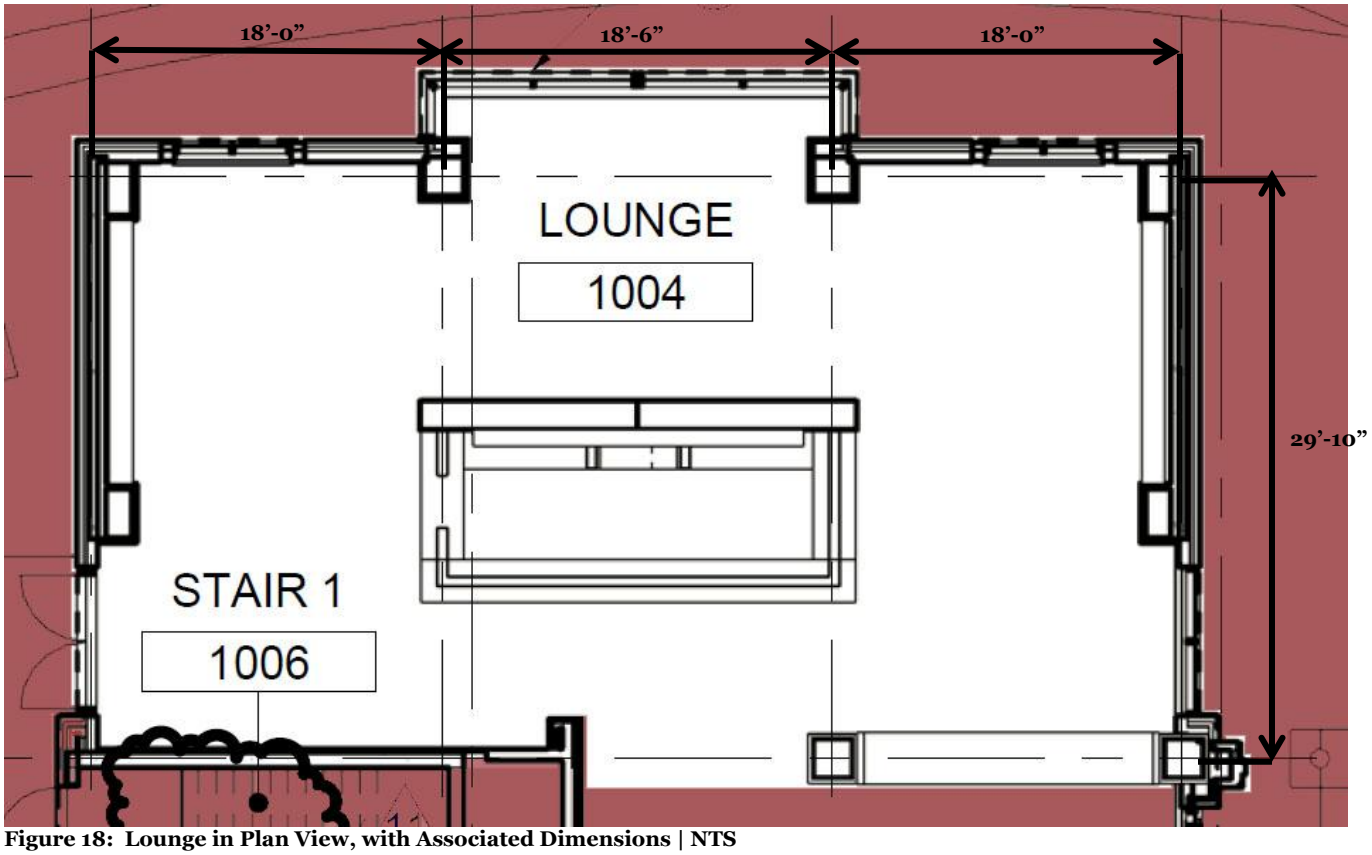

Figure 18: Lounge in Plan View, with Associated Dimensions | NTS

Existing Room Conditions

Area: 1730 SF

Dimensions: Approximately 29'-10" x 54'-0", with a general ceiling height of 14'-0"; a 1'-8" cove is above the bar which stretches to the glazing on the northern facade

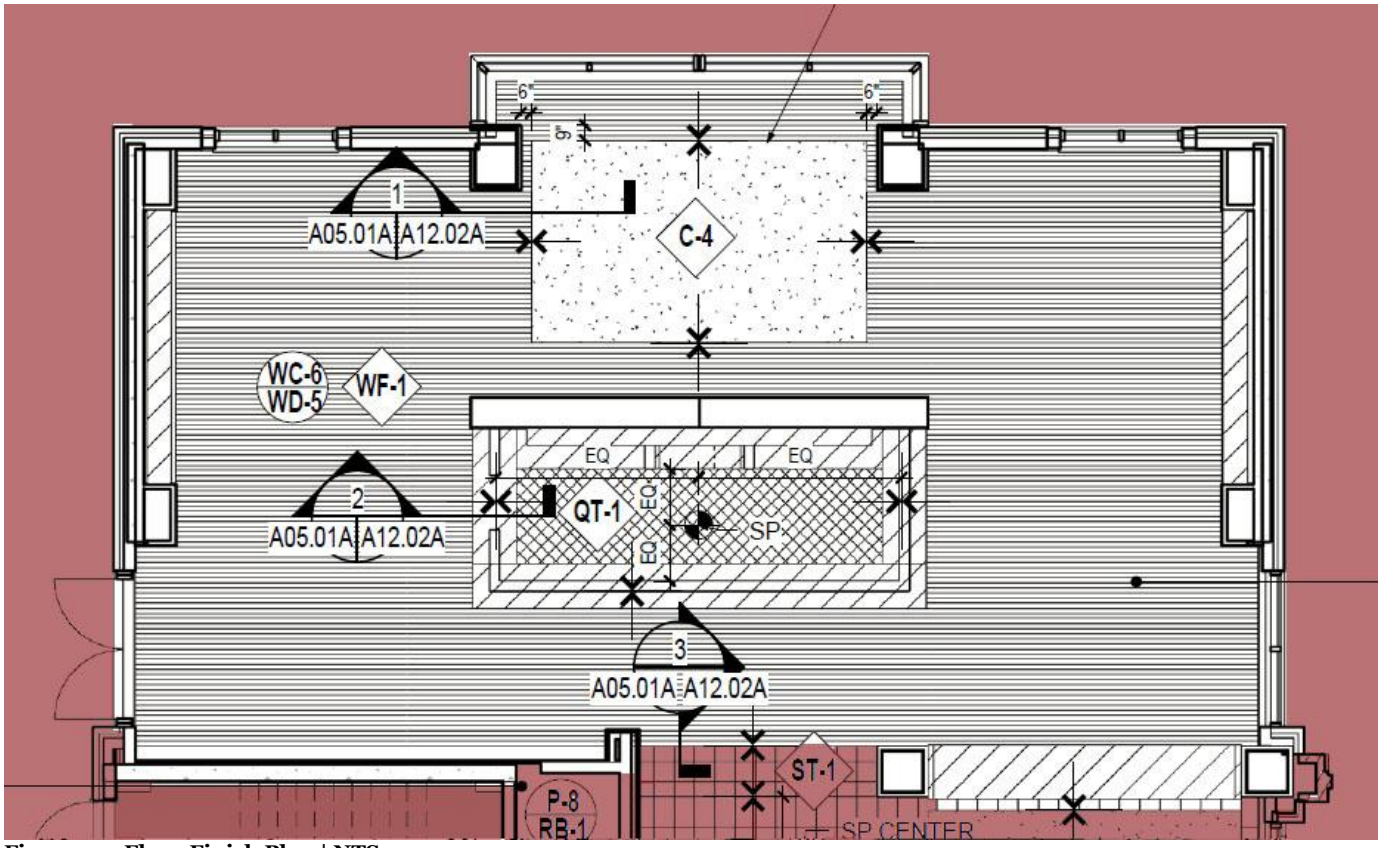

Figure 19: Floor Finish Plan | NTS

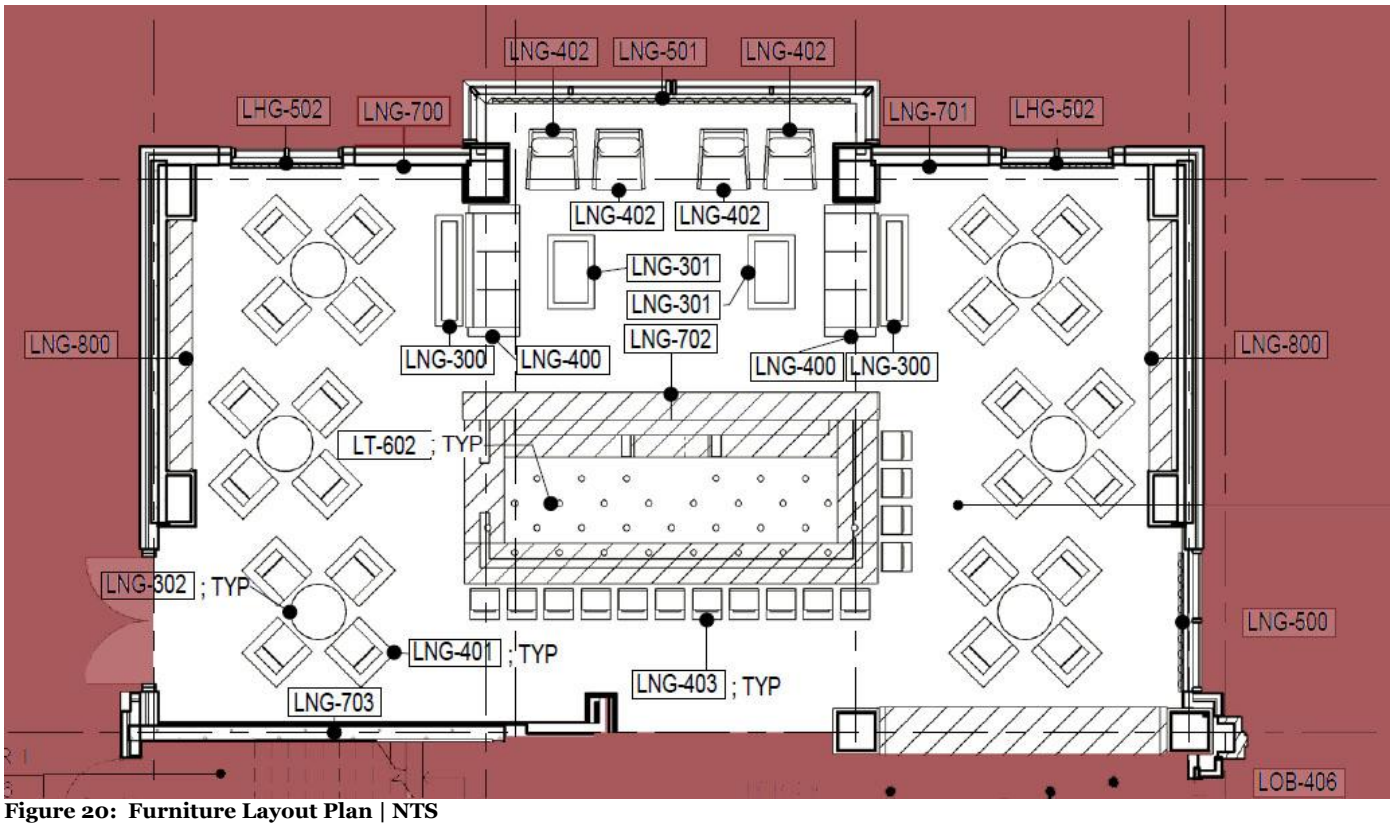

Figure 20: Furniture Layout Plan | NTS

Furnishings and Accessories:

Furniture in the space consists of various tables, chairs, and bookshelves. Two dozen arm chairs (LNG-401) and six circular tables (LNG-302) provide guests relaxing group seating areas for conversation. Fifteen bar stools (LNG-403) offer patrons seating around the centrally located bar (LNG-702). There is even more seating on the northern part of the Lounge, where two plush sofas (LNG-400) and four chairs (LNG-402) are situated near the floor to ceiling windows. Coffee tables (LNG-301) and shelving units (LNG-300) are also in this area of the Lounge. Two televisions are set in the center of the bookshelves on the eastern and western walls. There is also some artwork on a couple of the walls.

Architectural Features:

On the eastern and western walls of the Lounge, large bookcases span about 8'-6" wide and the entire height of the space. The bookcases are made from medium density fiberboard and have a diagonal-grid pattern with shelving openings. There is a larger opening in the center of each bookcase for a television.

Sheer drapes hung from the ceiling in front of the glazing provide diffuse daylight in the space during the daytime.

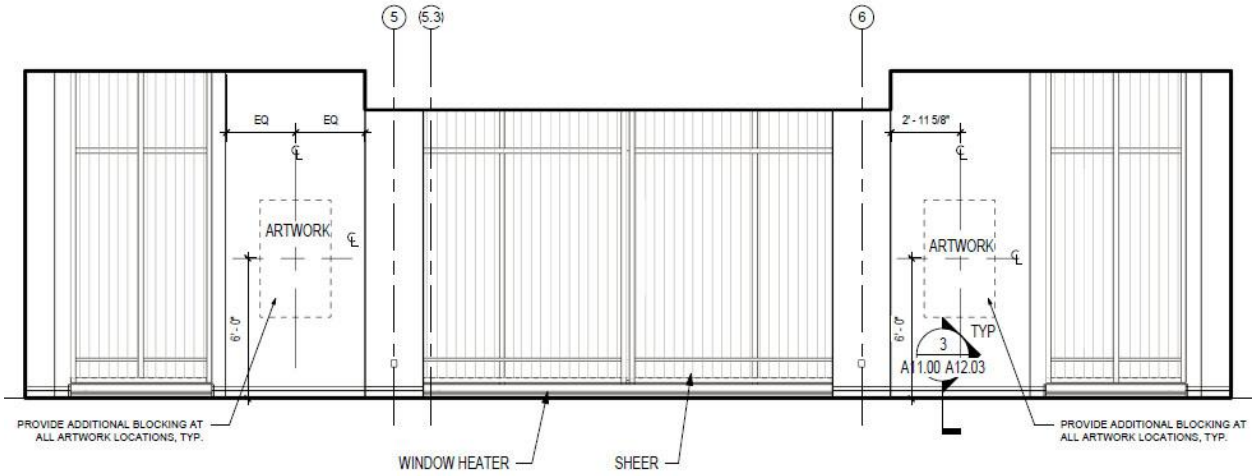

Figure 21: North Elevation | NTS

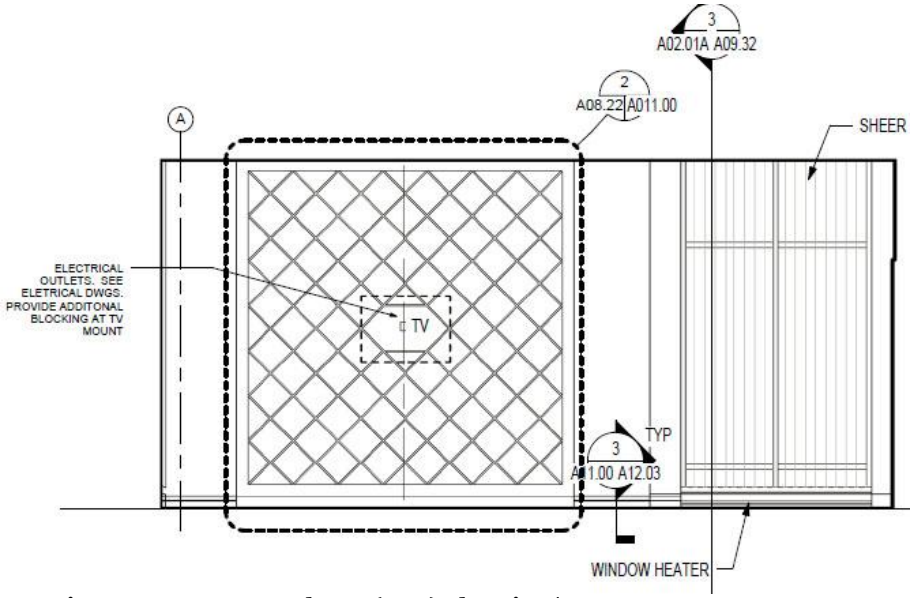

Figure 22: Lounge Bookcase (East) Elevation | NTS

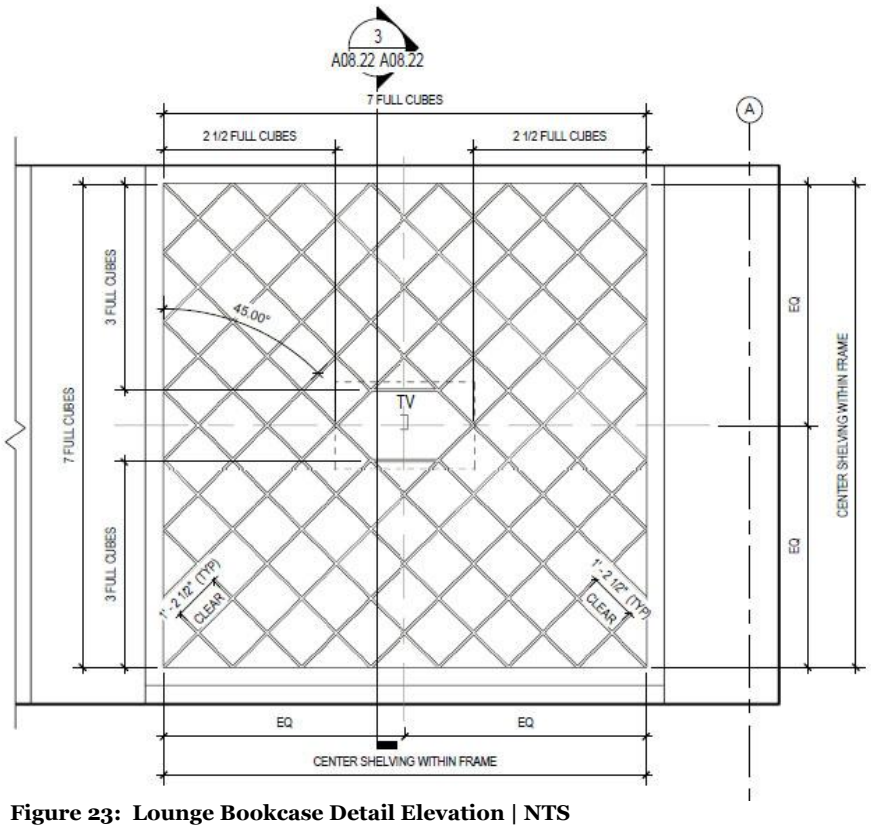

Figure 23: Lounge Bookcase Detail Elevation | NTS

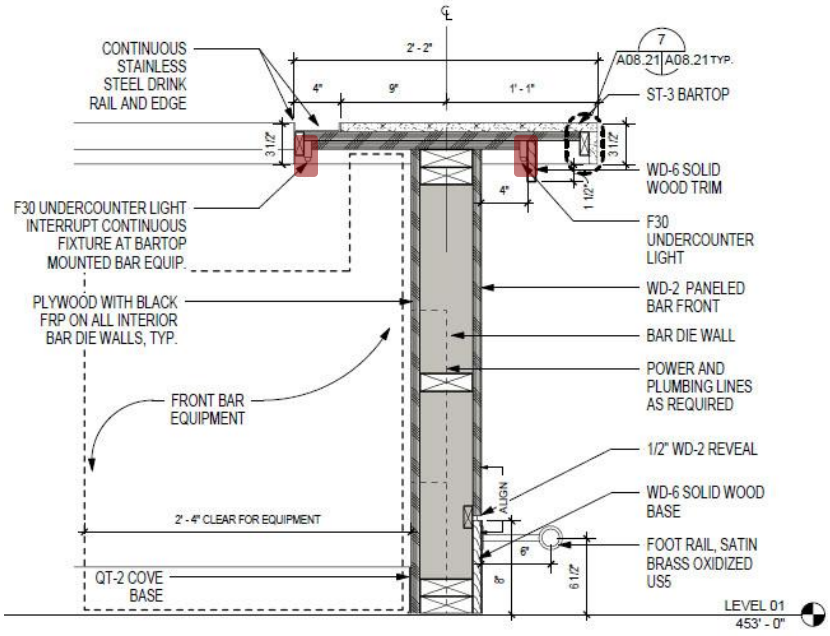

Figure 24: Bar Detail | Undercounter Lighting

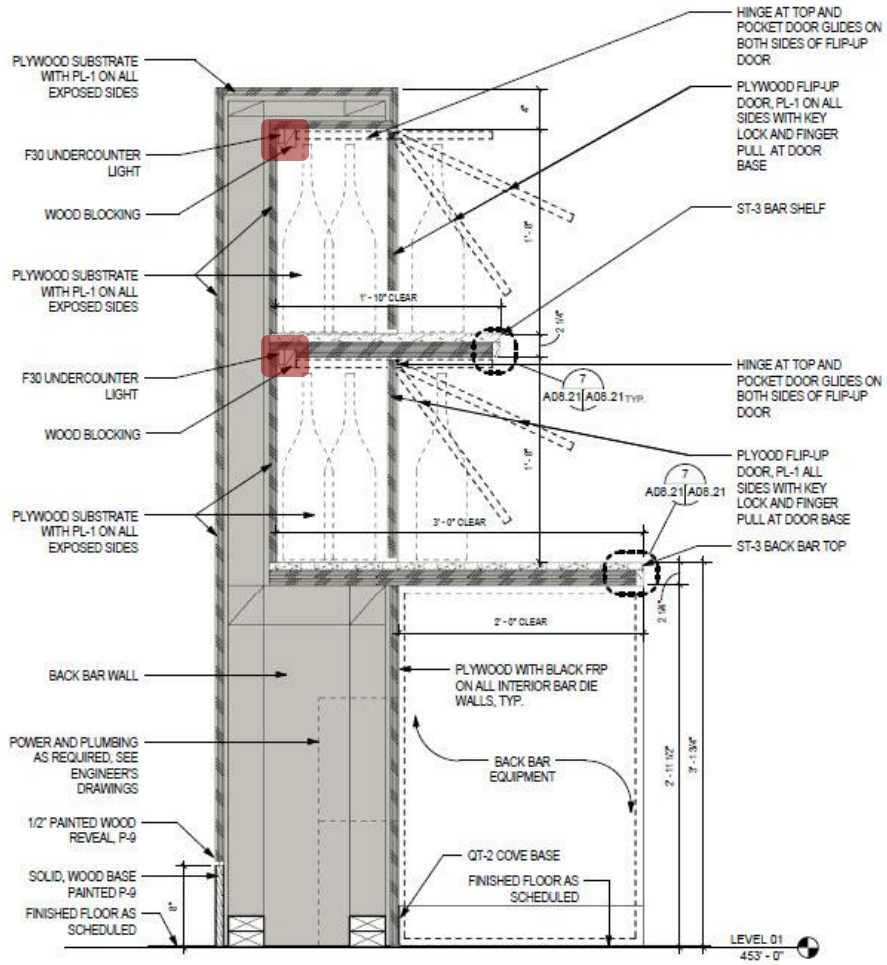

Figure 20: Section of the Bar Display | Undercounter Lighting

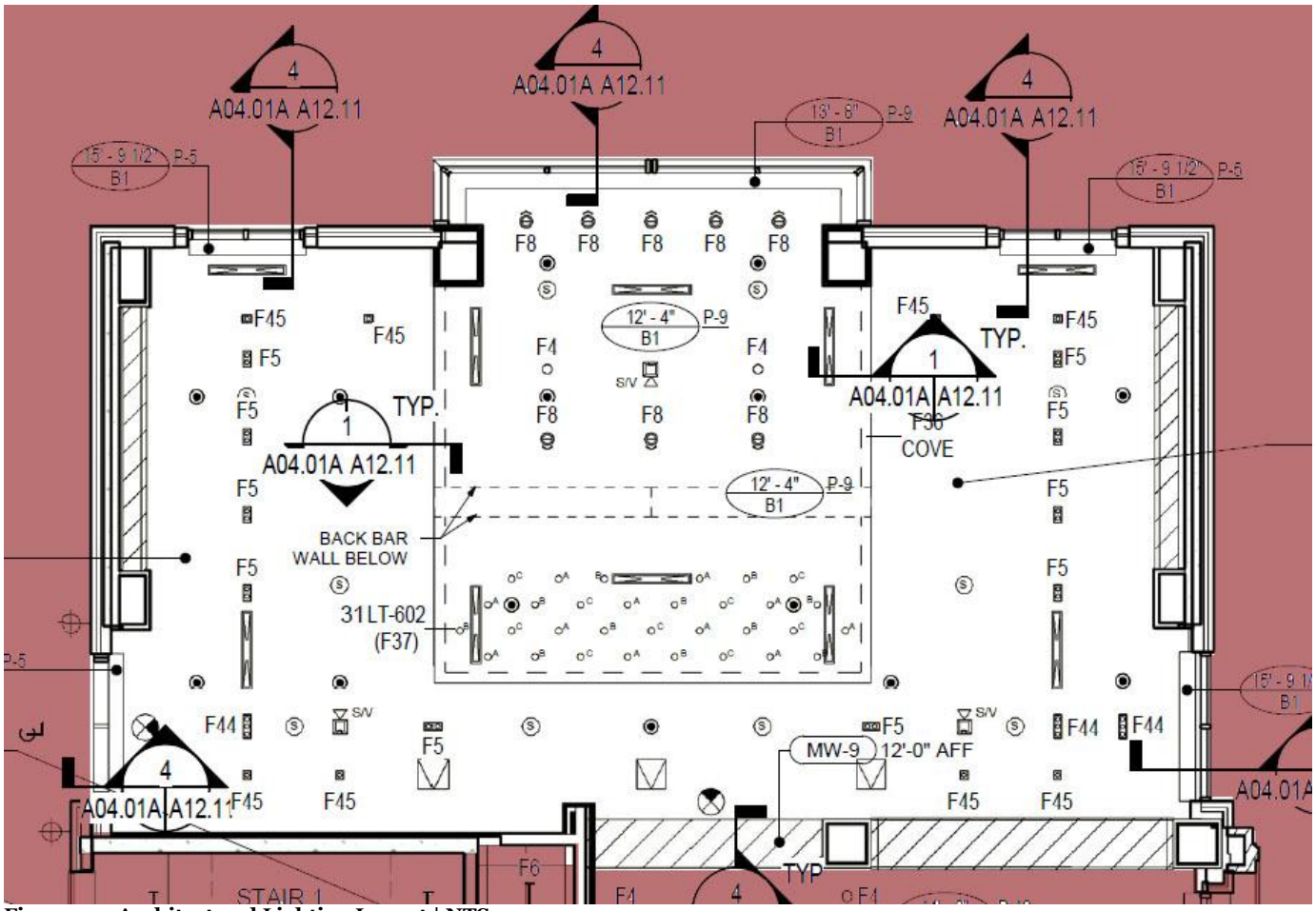

Figure 21: Architectural Lighting Layout | NTS

Lighting Layout and Equipment:

The lighting for the Lounge is very decorative. Small decorative pendants at varying heights hang above the bar top. LED strips illuminate bottles on display in the bar display and are also utilized underneath the counters. Fluorescent cove lighting is implemented into the design, emphasizing the height of the space. Recessed accent lighting is used to draw attention to the art on the walls. For general lighting in the room, recessed downlights are employed. Most of the lamps are halogen and therefore are ideal for the dimming presets.

Existing Luminaire Schedule | Lounge									
Fixture Type	Manufacturer	Description	Catalog No.	Lamps		Volts	Ballast	Mounting	Notes
				No.	Type				
F4	Lightolier	4" recessed halogen downlighting with (1) MR-16 35W max lamp	C4MRDWHW/C4LV-AFPF2-35W-MG8	1	FMV/FG/ULTRA TITAN 35MR16NFL-18k hrs USHIO	120	--	Recessed	
F5	Lightolier	6" recessed metal halide accent lighting with (2) 39W PAR30L lamps	PA2H3070**-MG8	2	35W PAR30L lamps	120	--	Recessed	
F8	Lightolier	4" recessed halogen accent lighting with (1) MR-16 37W max lamp	C3MRAWHW/C3LV*V-MG8	1	OSRAM 58634 37MR16NFL/IR/C-TITAN	120	--	Recessed	
F30	iLight	Surface mounted linear warm white LED encased with frosted PVD flexible housing with remote power	T-24V-*28-S-CI-SC	1	1-2800K LED 5W/LF	120	Remote power supply	Surface	Lounge counters
F36	Lightolier	Surface-mounted fluorescent strip light, rigid housing with (1) F32T8 lamp	SS-4-S-1-32-HILUME-MG8	1	F32T8/SPX30 G.E.	120	Integral HPF Lutron Hilume	Cove	Contractor to coordinate mounting in coves.
F37		Decorative low voltage pendant		1	20T3Q/MINISTAR/S G.E.	120	--	Pendant	Over bar
F44	Lightolier	Recessed 3-lamp MR16 adjustable accent light with integral 12V transformer	PA3M167EWL-AFPF2-LENS-37W LABEL-MG8	3	37 MR16 NFL/IR/C-TITAN	120	--	Recessed	
F45	Lightolier	Recessed single lamp MR16 adjustable accent light, nominal 5" SQ aperture, integral transformer	PA1M67EWL-AFPF2-LENS-37W LABEL-MG8	1	37 MR16 NFL/IR/C-TITAN	120	--	Recessed	

Table 6: Existing Luminaire Schedule | Lounge

Daylighting Elements:

The majority of the daylight entering into the Lounge comes from the glazing on the north. Floor to ceiling glazing across this end spans almost the entire length of the room, admitting natural light and little glare. There is also a small amount of glazing on both the western and eastern sides of the room. Sheer drapes extending from the ceiling of the glazing diffuse light coming into the space. There are no daylight control devices implemented into the room.

Control Devices:

The lounge is equipped with a dimming panel controlling eight zones and four preset scenes.

Lounge | Design Considerations and Criteria

Lighting Design Criteria and Considerations

(IESNA Lighting Handbook – Interior > Food Service Facilities > Dining)

- **Psychological Aspect:**
  The Lounge will be reinforcing the "Relaxing" Flynn impression. The Lounge is meant for hotel guests to unwind and enjoy good food and wine while relaxing and chatting amongst friends.

- **Appearance of Space and Luminaires:**
  The Lounge is an area of the Hotel and Conference Center where guests come to quietly enjoy small specialty platters and organic local and domestic wine. The space is meant for chatting with friends, family, or business partners, or even to perform small tasks in a quiet nook of the hotel. Because of the rich architectural finishes, lavish furniture, fine food and wine being served, and the artwork on display along the walls, the overall image and experience of the patrons is extremely important. Therefore, having decorative lighting fixtures in the Lounge to compliment the décor is critical to the overall ambience of the room.

- **Color Appearance and Color Contrast:**
  Lighting is not only critical when preparing food, but it is also important when serving food. Color rendering of the food is important because the food served will be fresh. Lamps with high CRIs should be considered (above 80). The CCT of the lamps should also be generally warm in the space, in order to enhance the relaxing atmosphere and wood finishes in the room.

- **Direct and Reflected Glare:**
  In order to avoid direct glare, general lighting should also be utilized with decorative lighting. Decorative lighting can sometimes appear "glary" if used as the only source of light. Some of the finishes in the Lounge are also semi-specular and polished, increasing the glare possibility to patrons and/or staff.

- **Point(s) of Interest:**
  The main feature in the Lounge is the bar, centrally located in the room. The face of the bar is clad in paneled wood with wooden trim, as well as the shelving. The shelves containing the bottles and wine are an important feature in the Lounge, as highlighting them will not only create visual interest but perhaps even promote more business. The floor to ceiling shelving also adds a different dimension to the room and can be highlighted using light. Artwork on the wall draws attention to the peripherals of the room if accented. Accentuating particular features along the walls provides nonuniform lighting, thus promoting a relaxing atmosphere.

- **System Control and Flexibility:**
  Since the Lounge is open during both afternoon and evening hours, utilizing a dimming system could provide variation in the quantity and quality of light. Smooth transitions between light levels are preferred in a dining establishment and the only way to do this would be to specify a dimming control (automatic preset and programmable).

- **Horizontal Illuminance:**
  Because simple visual tasks are being performed in the Lounge, **10fc** (Category C) is recommended on the workplane.

- **Vertical Illuminance:**
  Vertical illuminance values should be **3fc** (Category A).

- **Power Density Allowance: ASHRAE 90.1.2007**
  - Dining Area > Bar Lounge/Leisure Dining: **1.4 W/SF**
  - Additional Interior Lighting Power – In addition to the installation of general lighting, decorative lighting is permitted (chandeliers, sconces, or for highlighting features) as long as it does not exceed **1.0 W/SF**.
  - Total allowable = **2.4 W/SF**

Figure 25: Central Bar in the Lounge

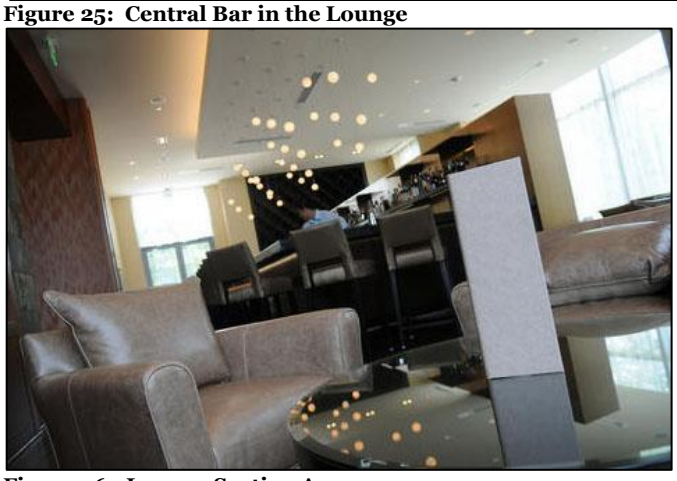

Figure 26: Lounge Seating Area

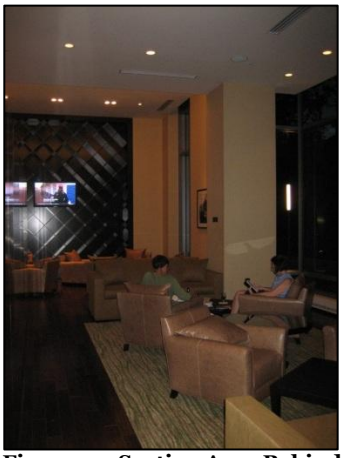

Figure 27: Seating Area Behind the Bar

Lounge | Evaluation and Critique

The Lounge in the Hotel and Conference Center is a special purpose space geared towards making guests feel comfortable and relaxed. This relaxing theme sparks in the Lobby and is carried into the Lounge. Decorative pendants hang at random heights over the bar, making the bar a focal point in the room. Cove lighting on the ceiling gives the room more dimension as the ceiling pop out hangs in the air. Recessed accent lights in the ceiling give the space more sparkle.

Rich colors and lush finishes are enhanced by the warm CCTs of the lamps. Careful thought of the color of the sources was analyzed and followed through, as warmer whites were typically selected. The layout of the luminaires over the bar are random, and therefore do not need to coincide with the furniture. These pendants draw attention towards the bar and sparkle in the air.

It is evident that through the use of light, a relaxing atmosphere is portrayed in the Lounge with the current design. Light stays on the peripherals of the space, highlighting the walls and ceiling alike. Decorative and more intricate facets were utilized in the Lounge but do not distract from the mood.

Light Loss Factors:
**Use of the new procedure to find LDD was used. As the new handbook does not address RSDD, it was not calculated below. According to the new handbook, a LEDs LLD is assumed to be 0.7. A 12 month cleaning interval and "clean" environment was assumed. Any other LLFs not displayed are assumed to be 1.0.*

Light Loss Factors | Lounge				
Fixture Type	**LLD**	**LDD**	**BF**	**Total LLF**
F4	0.88	0.94	--	0.83
F5	0.82	0.94	1.00	0.77
F8	0.88	0.94	--	0.83
F30	0.70	0.94	0.80	0.53
F36	0.95	0.94	0.87	0.78
F37	0.91	0.94	--	0.86
F44	0.88	0.94	--	0.83
F45	0.88	0.94	--	0.83

Table 7: Light Loss Factors | Lounge

LPD | Lounge				
Fixture Type	Quantity	Watts/Luminaire	Watts/LF	Total Watts
F4	6	37	-	222
F5	10	37	-	370
F8	8	37	-	296
F30	72 LF	-	5	360
F36	22	32	-	704
F37	28	22	-	616
F44	3	37	-	111
F45	9	37	-	333
			Total Watts	3012
			Total W/SF	**1.74**

Table 8: LPD | Lounge

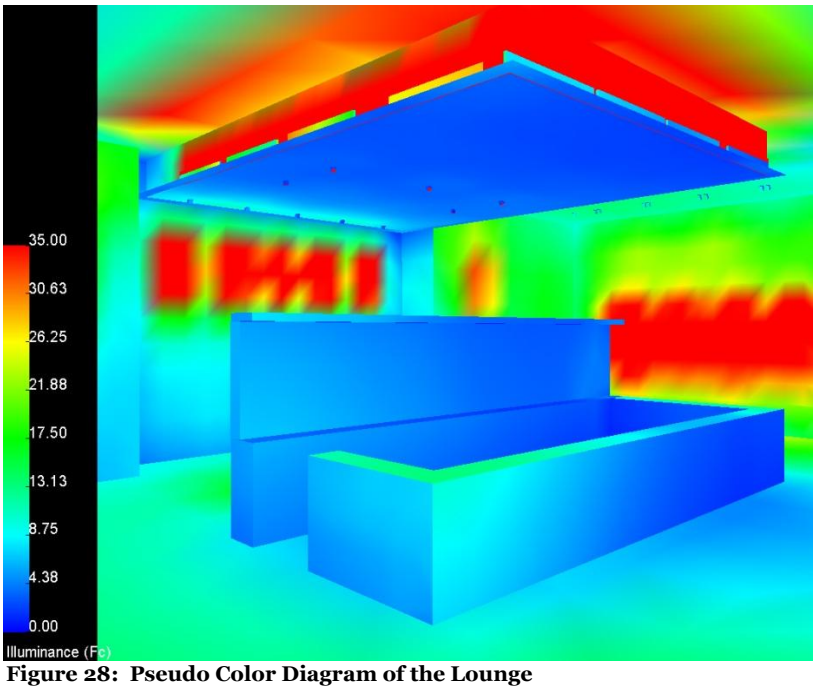

Figure 28: Pseudo Color Diagram of the Lounge

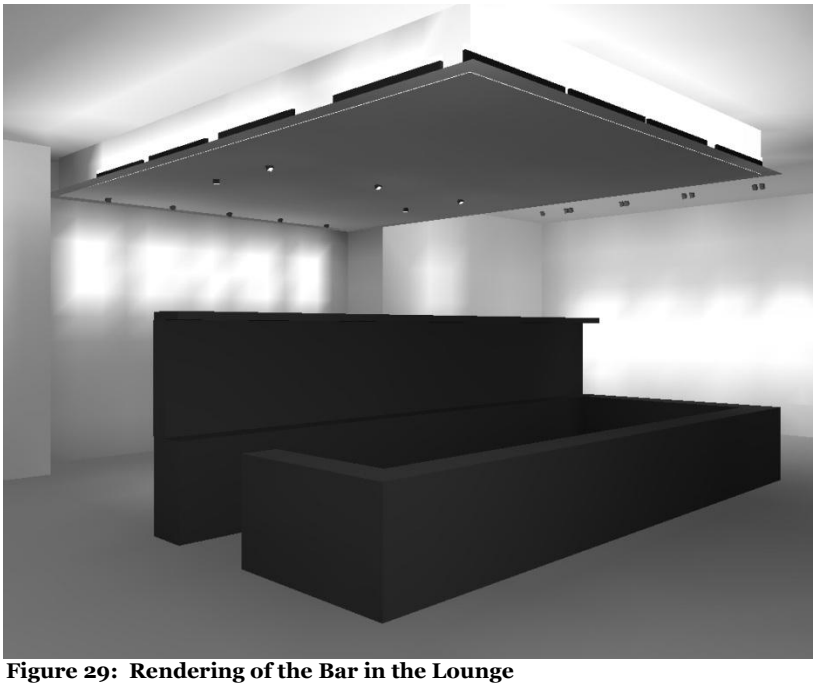

Figure 29: Rendering of the Bar in the Lounge

Maximum Illuminance	*Average Illuminance*	*Minimum Illuminance*
29fc	8.23fc	0fc

Figure 30: Illuminance Values | AGI32

Exterior Courtyard and Facade | Existing Conditions

Description

As guests arrive at the Hotel and Conference Center, they will drive through an exterior courtyard with a triangular shaped plaza. The façade of the Hotel and Conference Center is made up of brick two types of brick. The public spaces of the building on the first floor all have a more decorative brick with accent bands. Precast cornices break up the tower of the hotel into horizontal lines, accentuating the length of the building. Concrete panels beneath the 6'-0" x 6'-8" windows enhance the height of the hotel tower. Glazed aluminum window walls wrap around the first floor of the Hotel and Conference Center, allowing natural light into the public areas of the building.

Activities | Tasks:

- Hotel and Conference Center entrance and drop-off
- Walking
- Sitting outside

Materials:

Brick; precast decorative frames with metal; spandrel panels and screen walls; glazed aluminum window walls (double pane, clear, Low-E insulating glazing) with a transmissive value of 0.46; metal entry canopies

Figure 31: Hotel Entrance

Figure 32: Hotel and Conference Center

Figure 33: Conference Center Entrance

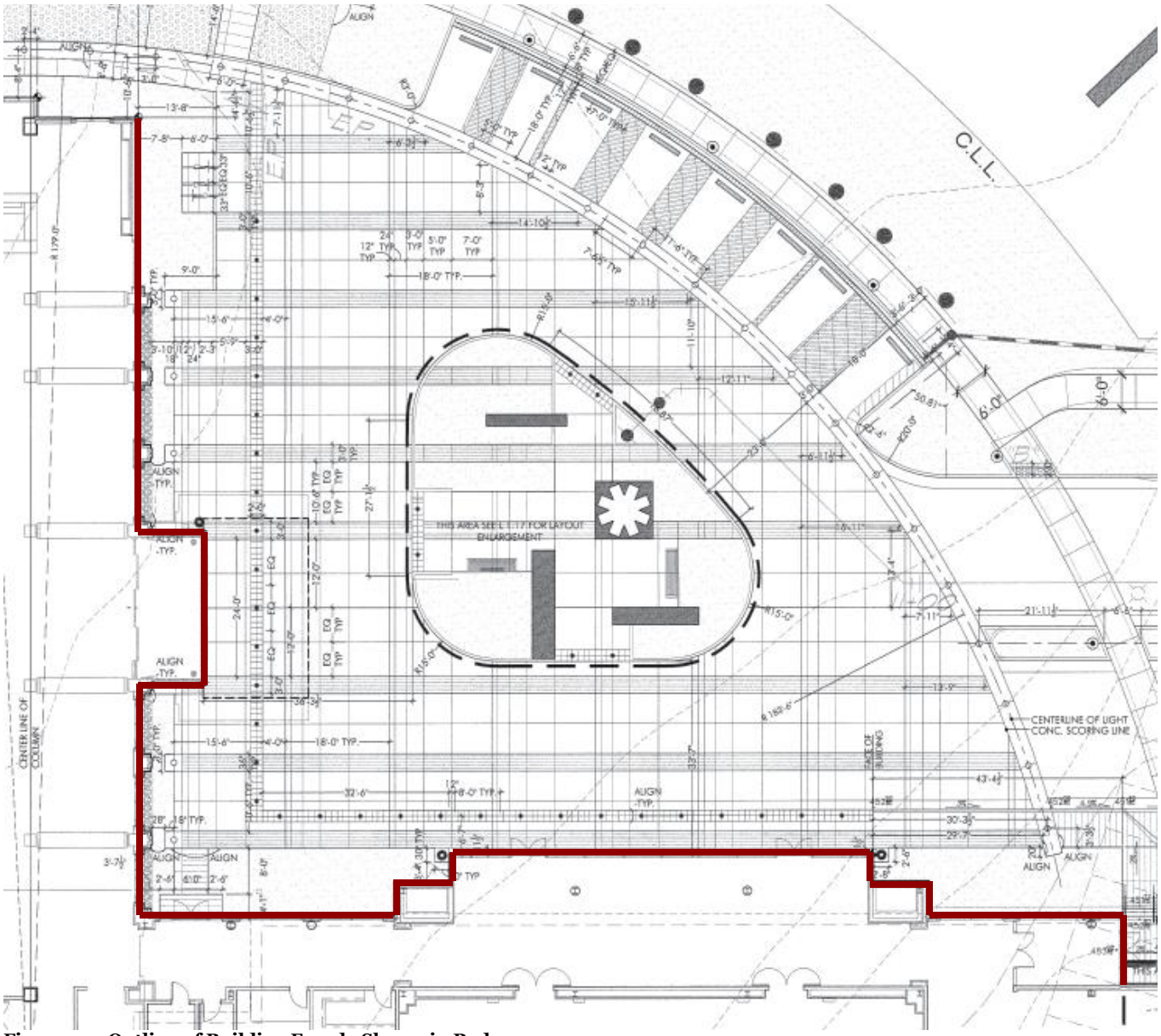

Figure 34: Outline of Building Facade Shown in Red

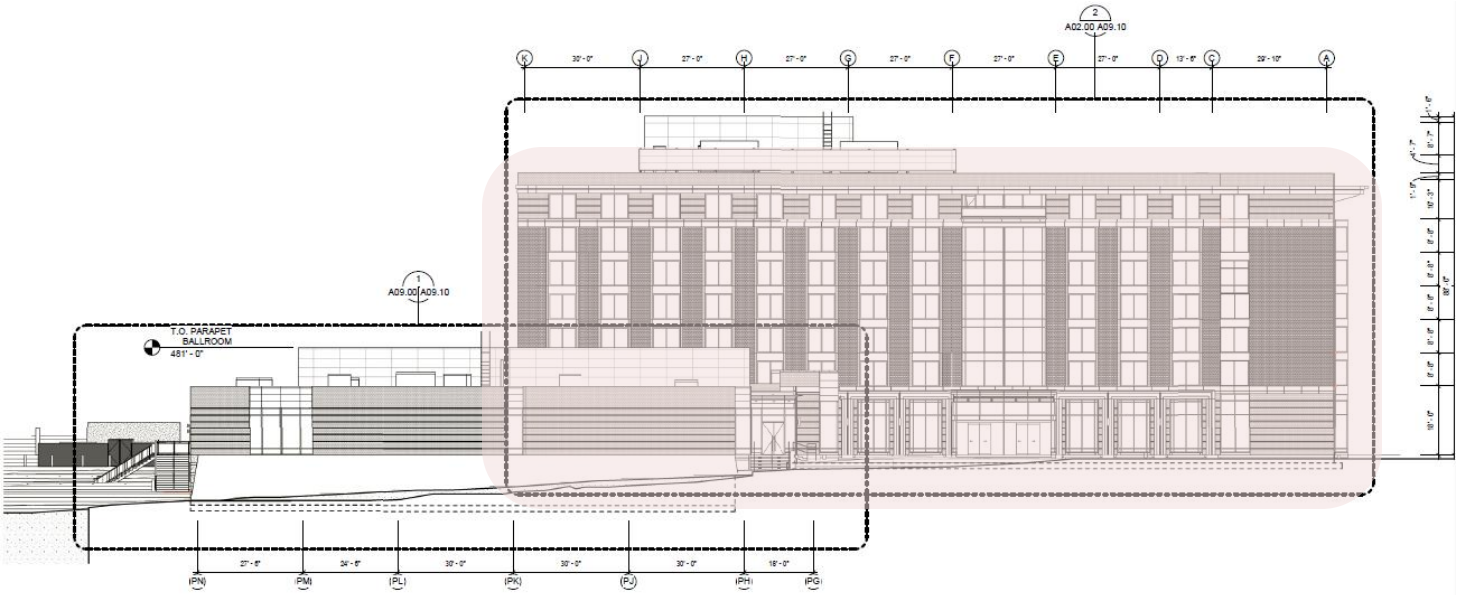

Figure 35: Front Facade | Hotel

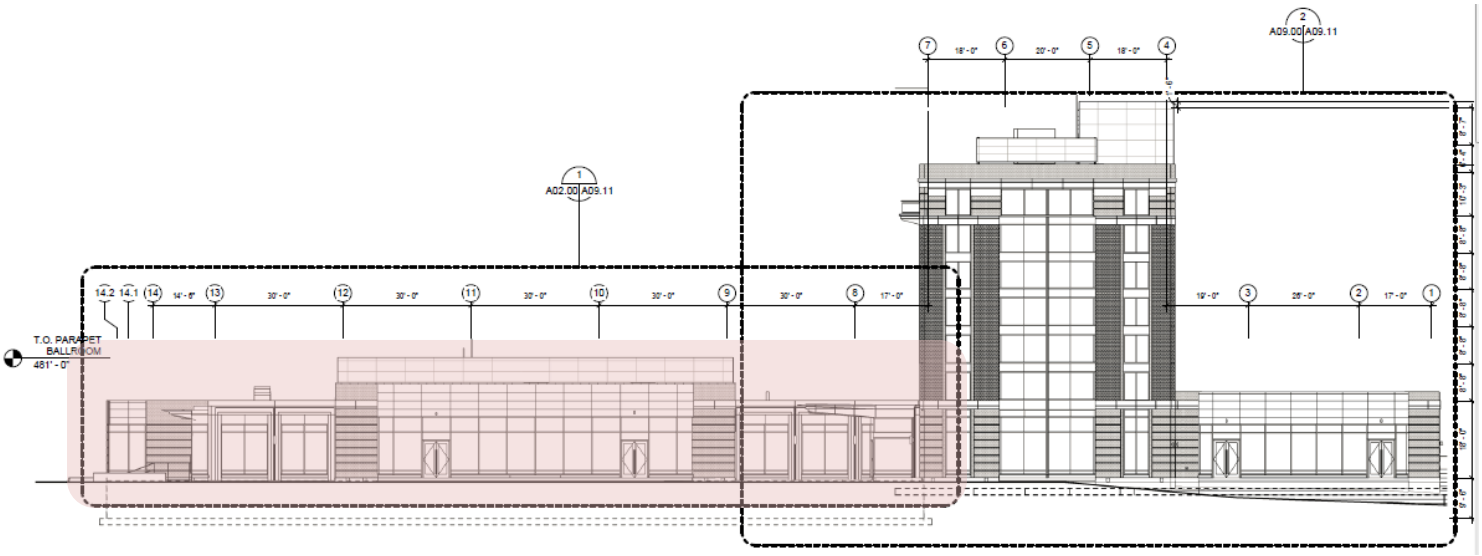

Figure 36: Front Facade | Conference Center

Existing Room Conditions

Building height:

- 71'-7" to roof of Hotel
- 21'-0" to roof of Conference Center

Length of façade:

- 208'-0" total length of front of Hotel
- 181'-6" total length of front of Conference Center

Architectural Features:

The porte cochere of the Hotel is made up of metal, spanning 24'-0" across (Figure 34). Glazed aluminum window walls and sliding doors bring a more modern feel to the otherwise all brick exterior. Concrete columns on the first floor add more depth and aid in giving the building a more linear feel. One balcony on the seventh floor (seen in Figure 27) is made from metal panel cladding.

The central plaza out front has several shrubs and trees, as well as concrete seating walls and both backed and backless benches for seating. This plaza creates an area where guests can congregate out front and relax outside (Figure 36). Exterior paths made of colored concrete and concrete draw guests into the building as they form straight linear paths from the street, running through the central plaza and matching with the column lines of the building (Figures 35 and 37).

Figure 37: Hotel Entrance Canopy

Figure 38: Building Access and Parking

Figure 39: Outdoor Plaza

Figure 40: Outdoor Plaza and Conference Center

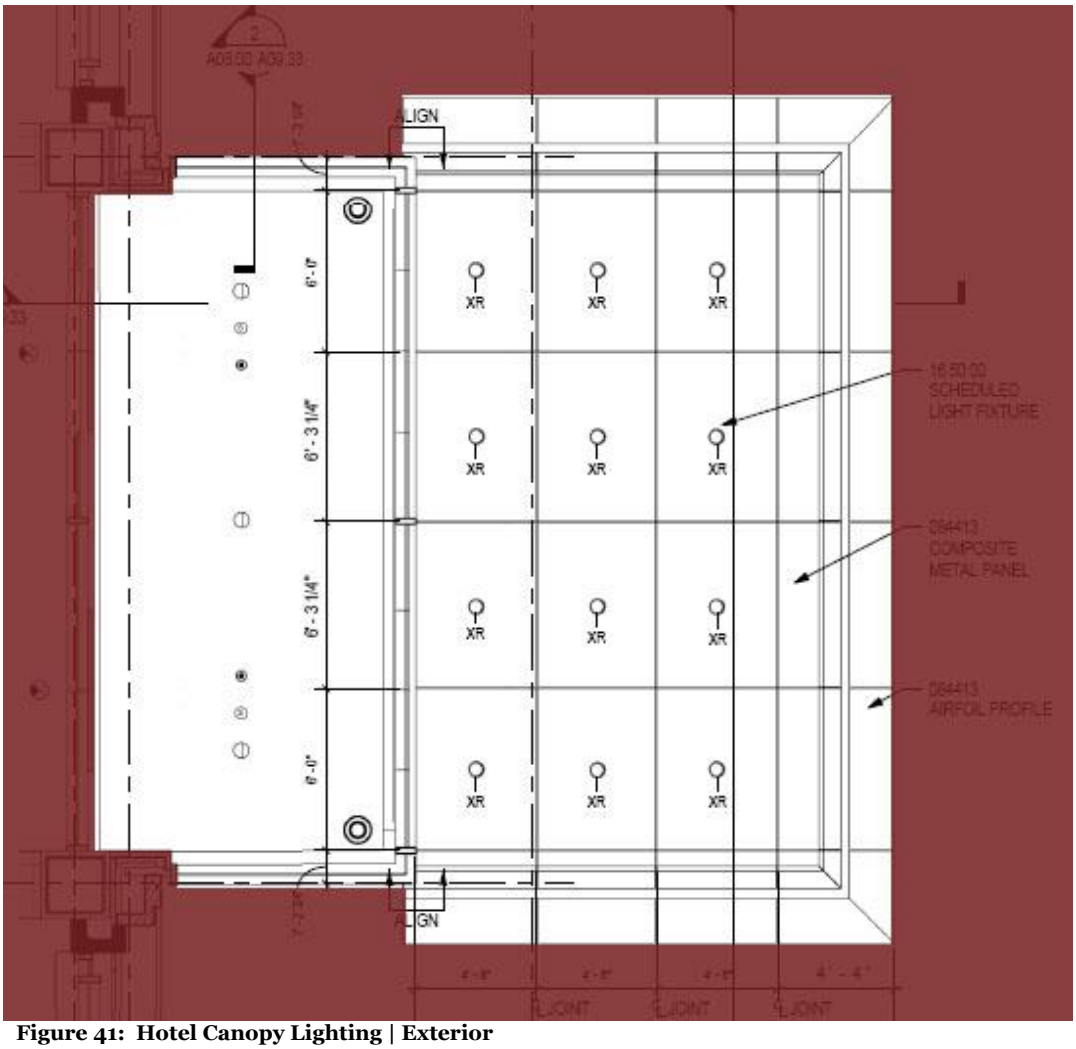

Figure 41: Hotel Canopy Lighting | Exterior

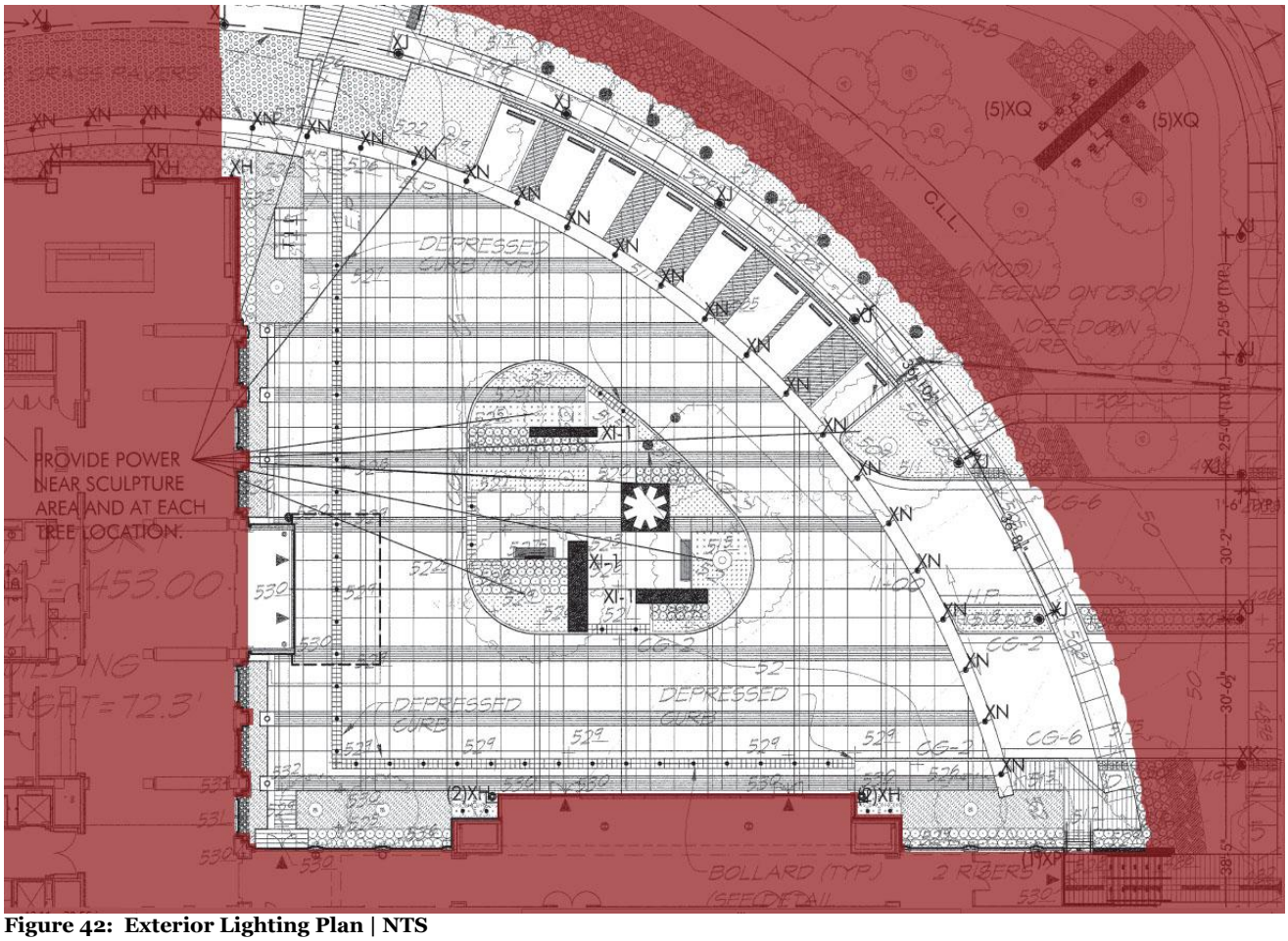

Figure 42: Exterior Lighting Plan | NTS

Lighting Layout and Equipment:

The exterior lighting is made up of multiple layers of light, such as bollards, step lights, ground and building mounted accent lighting, and landscape lighting. The Hotel canopy area is lit with downlights at the entrance. Both the Hotel and Conference Centers glow from within with light, making the public places more noticeable and welcoming to guests from the outside. A combination of LED, ceramic metal halide, and compact fluorescent lighting was used for the exterior spaces.

Figure 43: Exterior Lighting at Night, Looking to Conference Center

Figure 44: Hotel Canopy with Exterior Lighting

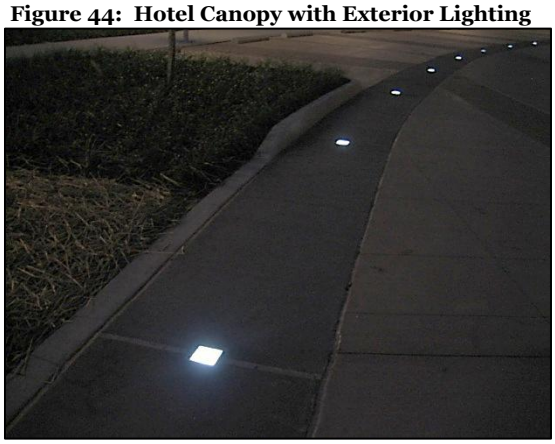

Figure 45: Recessed Ground Lighting

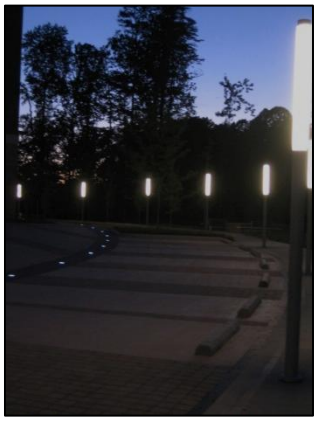

Figure 46: Light Poles

Figure 47: Exterior Lighting, Seen From Conference Center

Existing Luminaire Schedule | Exterior Façade and Site									
Fixture Type	Manufacturer	Description	Catalog No.	Lamps		Volts	Ballast	Mounting	Notes
				No.	Type				
XG	Winona Lighting	Compact fluorescent sconce/marker, fixture modified so that middle bands eliminated	5730-WL-23-F-X-277V-XXXFINISH-STD	2	F39BX/SPX30 G.E.	277	Electronic	Wall	Main entry doors
XH	Hydrel	In ground uplight 20W CMH with double lens "cool touch" lens system	M9420-A-20CMT4-277V-WWD-FLC-XXXCONDUIT-GS-GEB-XX-DNA	1	CMH20/TCU/830/G8.5	277	Integral HPF ballast	In ground	Building columns
XI	iLight	Surface mounted linear LED fixture	T24-X28-S-TBD-NC-CLIP	-	Warm white LED (wet location)	277	--	Surface	Site benches-remote power supply
XJ	Forms + Surfaces	Pedestrian scale exterior light pole	LPCOL-F32T8(2)-277V-NO SHIELD-132"-SSS	2	F32T8/TL830	277	Integral HPF ballast	--	
XN	Martini Brikko	Recessed ground mounted LED paver light of formed resin with drive over structural integrity	76920-38919	-	White LED 3.6W	120	--	--	Site drop off lane
XP	Bega	Recessed brick shaped LED steplight with white opal glass face	2289LED	-	White LED 6.4W	120	--	--	Outside steps
XR	Lightolier	7" recessed compact fluorescent down light, clear diffuse anodized aluminum reflector	8037-CCD-P/7142BU-MG8-DAMP LABEL	1	F42TT-830-GE	277	--	Recessed	Exterior canopies

Table 9: Existing Luminaire Schedule | Exterior Spaces

Exterior Courtyard and Facade | Design Considerations and Criteria

Lighting Design Criteria and Considerations

(IESNA Lighting Handbook – Outdoor > Building Exteriors > Entrances> Active (pedestrian/conveyance); Outdoor>Parks, Plazas, and Pedestrian Malls

- **Psychological Aspect:**
  When arriving at the Hotel and Conference Center, guests should feel welcomed as they approach the building. The façade and exterior courtyard should feel inviting and relaxing to guests.

- **Safety:**
  Guests need and want to feel safe and secure when staying at a hotel and lighting plays a critical role in this. Having the walkways and parking lots well lit at night will make guests feel safer about walking around outside. Lamps with good CRIs will enable good color appearance and modeling of others.

- **Connection with Architecture:**
  The lighting design on the façade should enhance the architecture of the building. The lighting should lead guests up to the front of the building. For example, highlighting the walking paths that lead up to the columns on the first floor. Having the Hotel and Conference Center glow from within on the first floor also gives the building another dimension as people drive by.

- **Direct Glare:**
  Direct glare should be avoided at all costs. As guests approach the building in their vehicles, any glare from luminaires could be dangerous to drivers and pedestrians. Light levels should stay at a relatively uniform illuminance on the site as guests make their way up the driveway, around the central plaza, and to the porte cochere. Direct glare is also relevant in that fixtures should be properly placed so as to not shine any light through the windows.

- **Horizontal Illuminance:**
  - Building Exteriors
    -Entrances > Active: 5fc
    -Prominent structures: 5fc
  - Gardens
    -General Lighting: 5:1 ratio
    -Paths, Away From Building: 10:1 ratio
    -Trees or Shrubbery, Emphasized: 3fc

- **Vertical Illuminance:**
  - Building Exteriors
    -Entrances > Active: 3fc
    -Prominent structures: 3fc
  - Gardens
    -General Lighting: 2:1 ratio
    -Paths, Away From Building: 3:1 ratio
    -Trees or Shrubbery, Emphasized: 3fc

- **Modeling of Faces or Objects:**
  When guests are outside walking to and from their cars late at night, they should be able to make out other people's facial features and the objects around them. This is so guests feel safe and comfortable while walking outside at night. The use of lamps with high CRIs will help achieve this.

- **Light Pollution and Light Trespass:**
  Because the Hotel and Conference Center is located near a major interstate and university, light pollution and light trespass post potential threats. If lighting the actual façade, minimizing the amount of uplight would help with light pollution. Luminaires used should also be direct around the perimeter of the site so as to reduce the effects of light trespass.

- **Power Density Allowance: ASHRAE 90.1.2007**
  - Tradable Surfaces > Building Grounds > Plaza Areas = **0.2W/SF**
  - Tradable Surfaces > Building Entrances and Exits > Main Entrances = **30W/LF** of door width, and Other Doors = **20W/LF** of door width
  - Tradable Surfaces > Building Entrances > Canopies and Overhangs = **0.5W/SF**
  - Nontradable Surfaces > Building Facades > = **0.2W/SF** for each illuminated wall or surface or 5.0W/linear foot for each illuminated wall or surface length

Exterior Courtyard and Facade | Evaluation and Critique

As guests approach the Hotel and Conference Center, they are greeted with numerous layers of light. Canopies of trees and shrubs are illuminated, bollards outline the designated parking area, and the Hotel and Conference Center glows from within with light. Step lights and lighting from underneath the seating blocks in the plaza orient guests horizontally.

Guests can clearly identify the main entrance of the Hotel and Conference Center when approaching the site. Bollards guide vehicles through the plaza and underneath the porte cochere. The porte cochere is easily distinguishable as it is lit with nine compact fluorescent downlights. Exterior sconces on the columns also draw attention towards the entrance. The lighting from inside the main floor has a tremendous impact on the night-time image of the building, too. Warm light glows from the interior, attracting guests inside.

The central plaza area in the courtyard uses only indirect light. This approach proves to be very enticing and mysterious to guests, as the absence of light here counterbalances with the luminous hotel behind it.

Overall, the existing lighting system for the exterior courtyard proves to be beneficial to the overall welcoming appearance the Hotel and Conference Center has strived to achieve. Decorative exterior luminares make up the system, with special consideration of architectural details, such as the Hotel's columns, main entrance canopy, and the lighting benches in the central plaza. Façade lighting was not extensively utilized and could be addressed more, as long as the system takes into consideration the criteria set forth above.

Light Loss Factors
**Use of the new procedure to find LDD was used. As the new handbook does not address RSDD, it was not calculated below. According to the new handbook, a LEDs LLD is assumed to be 0.7. A 24 month cleaning interval and "dirty" environment was assumed. Any other LLFs not displayed are assumed to be 1.0.*

Light Loss Factors | Exterior				
Fixture Type	**LLD**	**LDD**	**BF**	**Total LLF**
XG	0.88	0.73	0.88	0.57
XH	0.66	0.59	1.00	0.39
XI	0.70	0.59	0.80	0.33
XJ	0.95	0.73	1.01	0.70
XN	0.70	0.59	0.80	0.33
XP	0.70	0.73	0.80	0.41
XR	0.94	0.73	0.98	0.67

Table 10: Light Loss Factors | Exterior

Ballroom | Existing Conditions

Description

The Hotel and Conference Center can highlight various social events in its Ballroom, including themed events, cocktail receptions, company outings, anniversary parties, reunions, and wedding receptions. Capacities vary in the room, as two operable partitions can separate the Ballroom into one, two, or three salons. The Ballroom accommodates up to 579 guests in a reception setting, 611 as a theater, and as many as 456 in a banquet setting.

Activities | Tasks:

- Dining
- Socializing
- Receptions
- Parties/dancing

Main Surface	Description	Tag	Manufacturer	Color	Reflectance
Ceiling	Overall Ceilings	P-1	Benjamin Moore	Antique Lace	0.79
	Ceiling popups	P-7	PPG	Golden Ecru	0.56
Floor	Carpet, ballroom inlays	C-5	--	--	0.18
Walls	General wall covering	WC-3	--	--	0.07
	Ballroom space inlays wall covering	WC-9	--	--	0.13
	Millwork surround accent	WC-14	--	--	0.01
	Wall trim	P-1	Benjamin Moore	Antique Lace	0.79
Woodwork	Wood veneer, sliced andes cedar with semi-open pore lacquer 30% sheen	WD-1	Danzer Specialty Veneer	--	0.24

Table 11: Materials and Reflectances | Ballroom

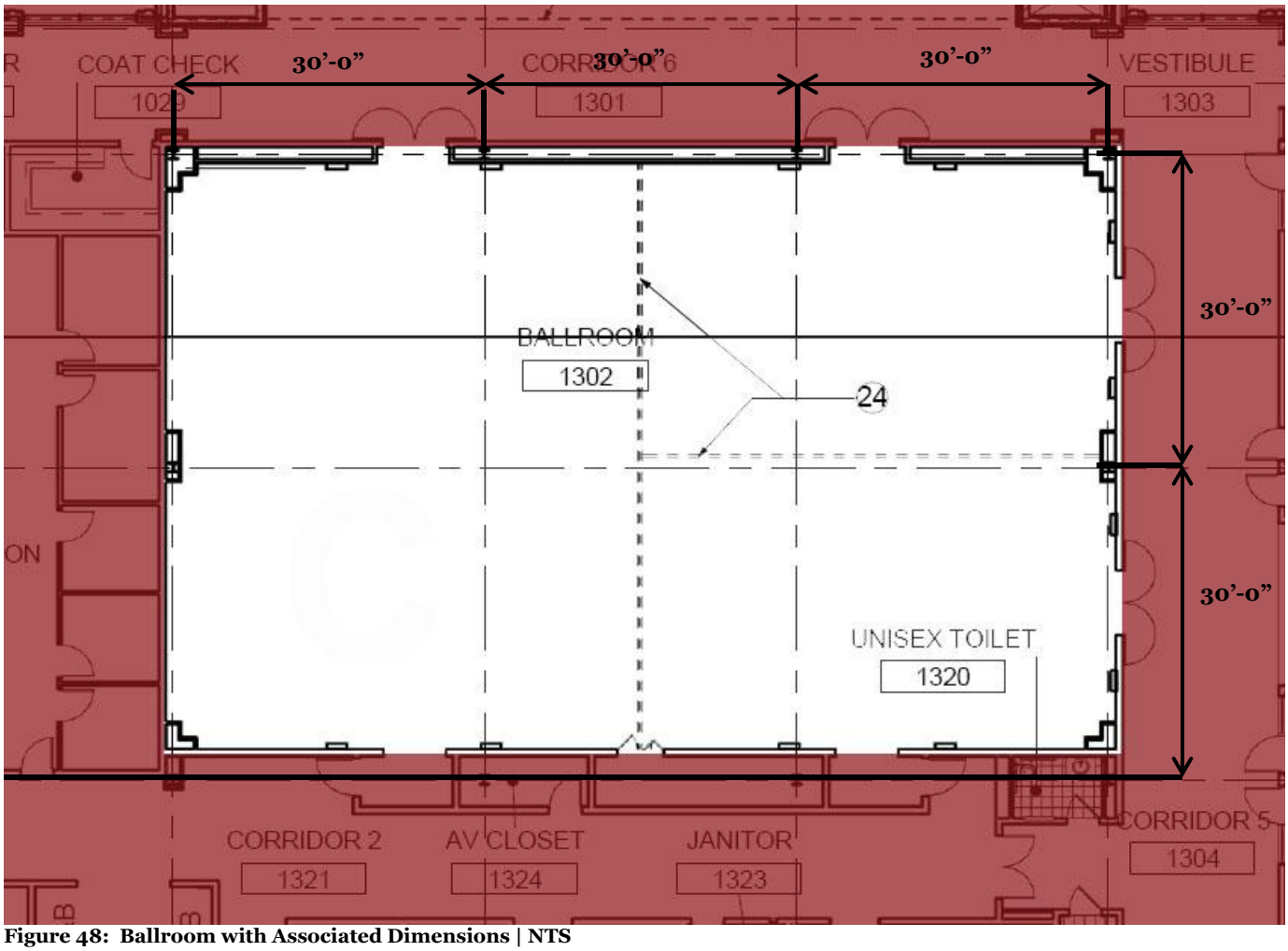

Figure 48: Ballroom with Associated Dimensions | NTS

Existing Room Conditions

Area: 5400 SF

Dimensions: Approximately 90'-0" x 60'-0", with a general ceiling height of 16'-0"; (4) 2'-0" ceiling pop-ups spaced in the center of the room with (4) 2'0" ceiling pop-ups inside of them

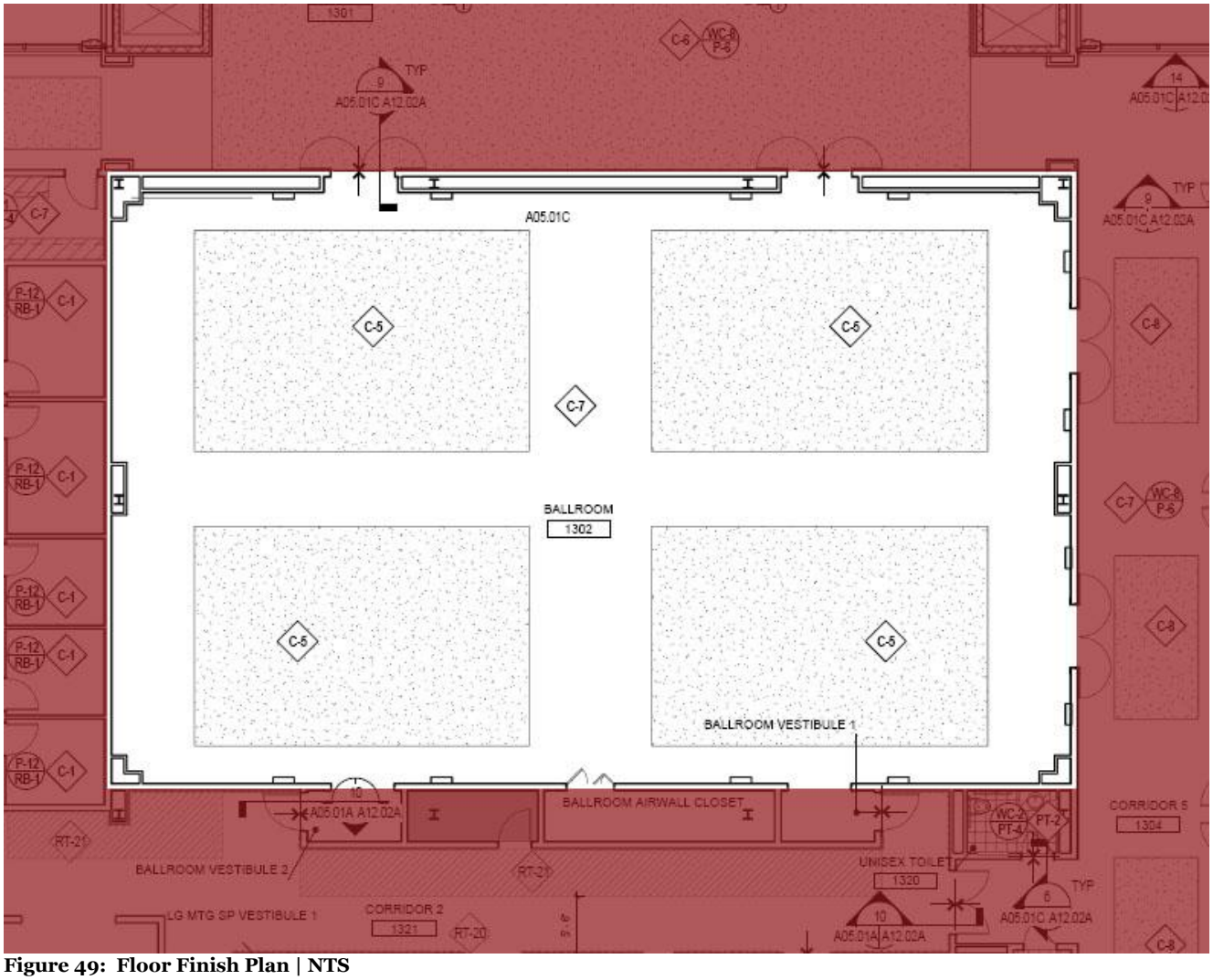

Figure 49: Floor Finish Plan | NTS

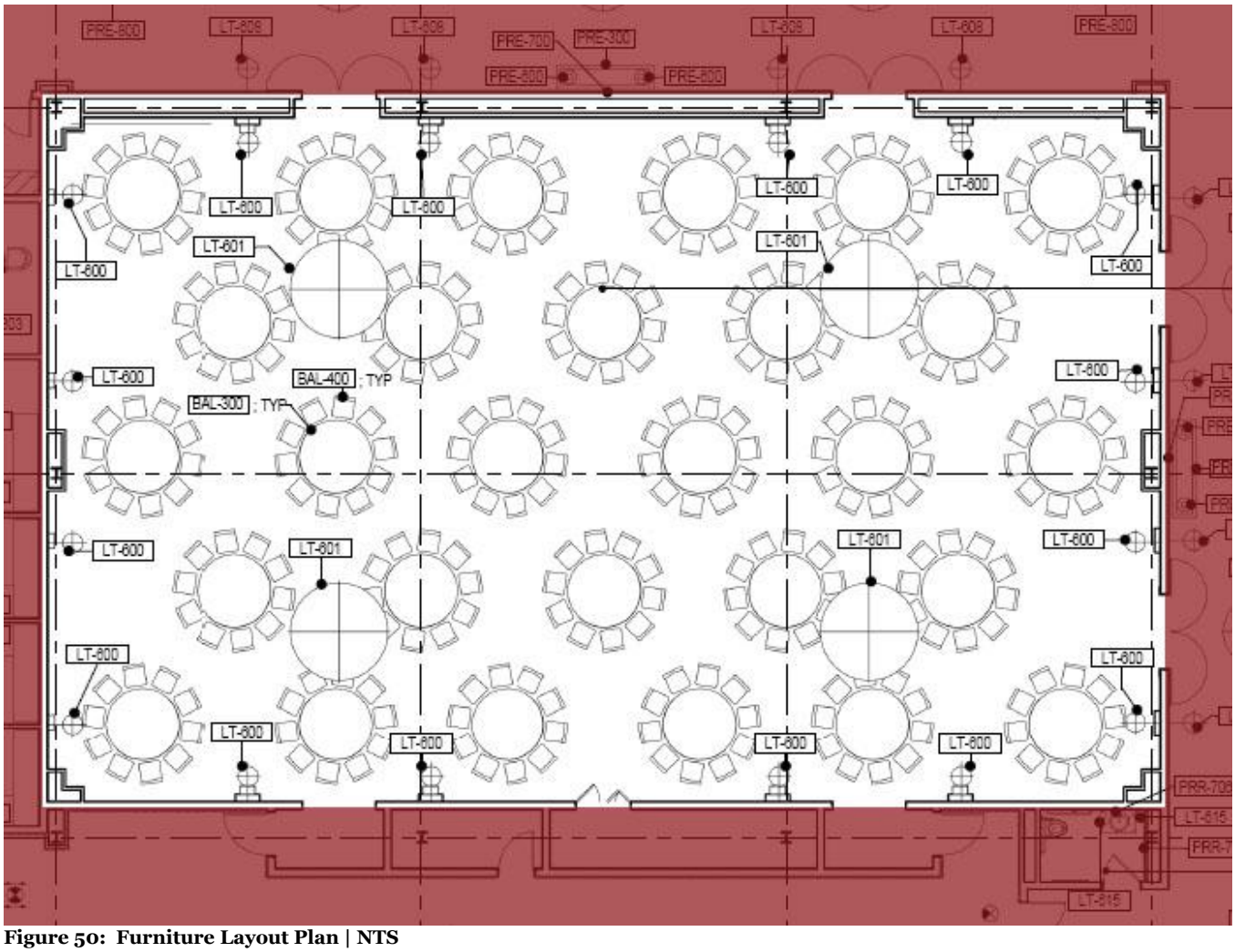

Figure 50: Furniture Layout Plan | NTS

Furnishings and Accessories:

The furniture designated for the Ballroom includes specialty decorative wall sconces (LT-600) around the perimeter of the room and four large decorative pendants (LT-601). Other furniture consists of 28 large dining tables (BAL-400) with 10 dining chairs at each.

Figure 51: Ballroom Lighting

Architectural Features:

The Ballroom has four main double door entrances and two single door entrances. Each of the doorways has decorative wooden millwork around it, with sconces placed on either side of the doors. Burgundy, green, and taupe colors in the plush carpet compliment the dark millwork. Decorative crown molding placed around each of the coves glows with golden light.

Figure 52: Decorative Chandelier and Coves

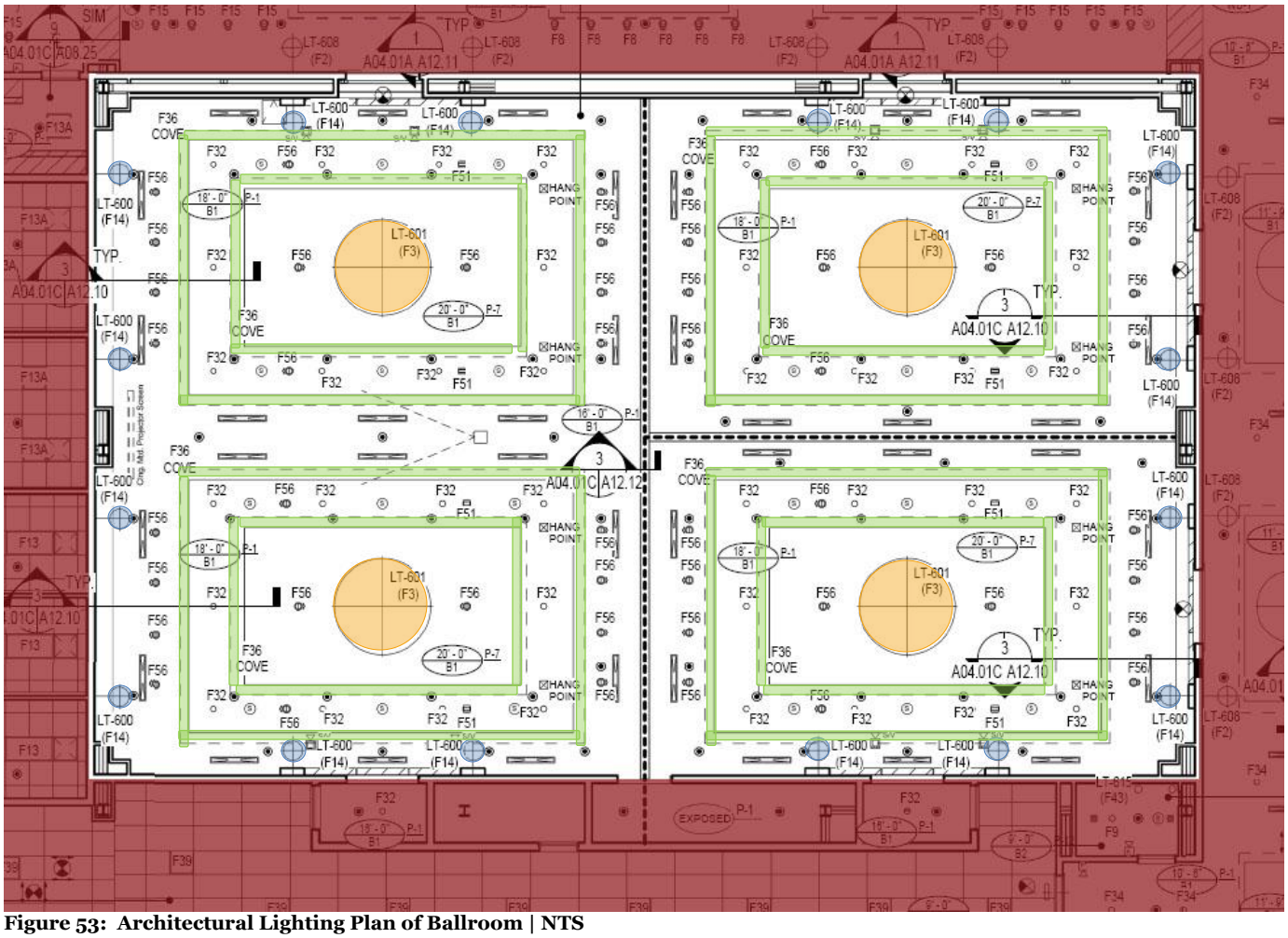

Figure 53: Architectural Lighting Plan of Ballroom | NTS

Lighting Layout and Equipment:

Decorative chandeliers (seen in orange), wall sconces (seen in blue), coves (seen in green), and accent lights comprise of the lighting system in the Ballroom. The lighting layout is ideal for the partition system installed, as the four cove systems split up nicely into the three separate smaller ballrooms if desired. The majority of the lighting is halogen, as all of the recessed accent lights and sconces are halogen. Fluorescent and compact fluorescent lamps are utilized in the coves and chandeliers respectively.

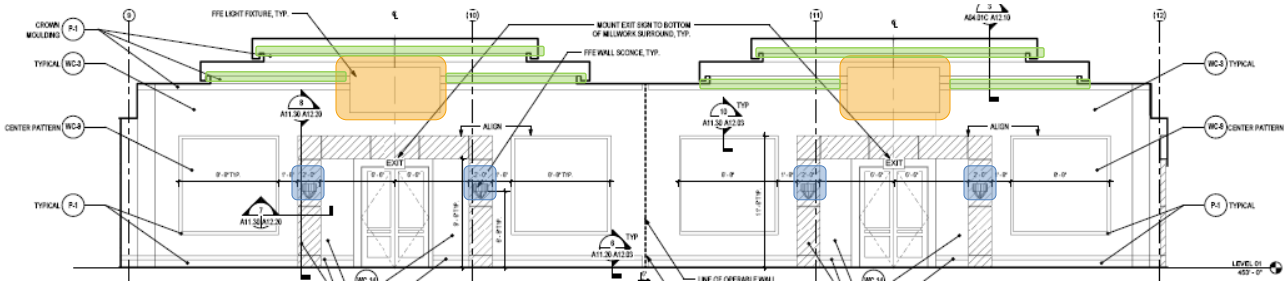

Figure 54: Ballroom North Elevation | NTS

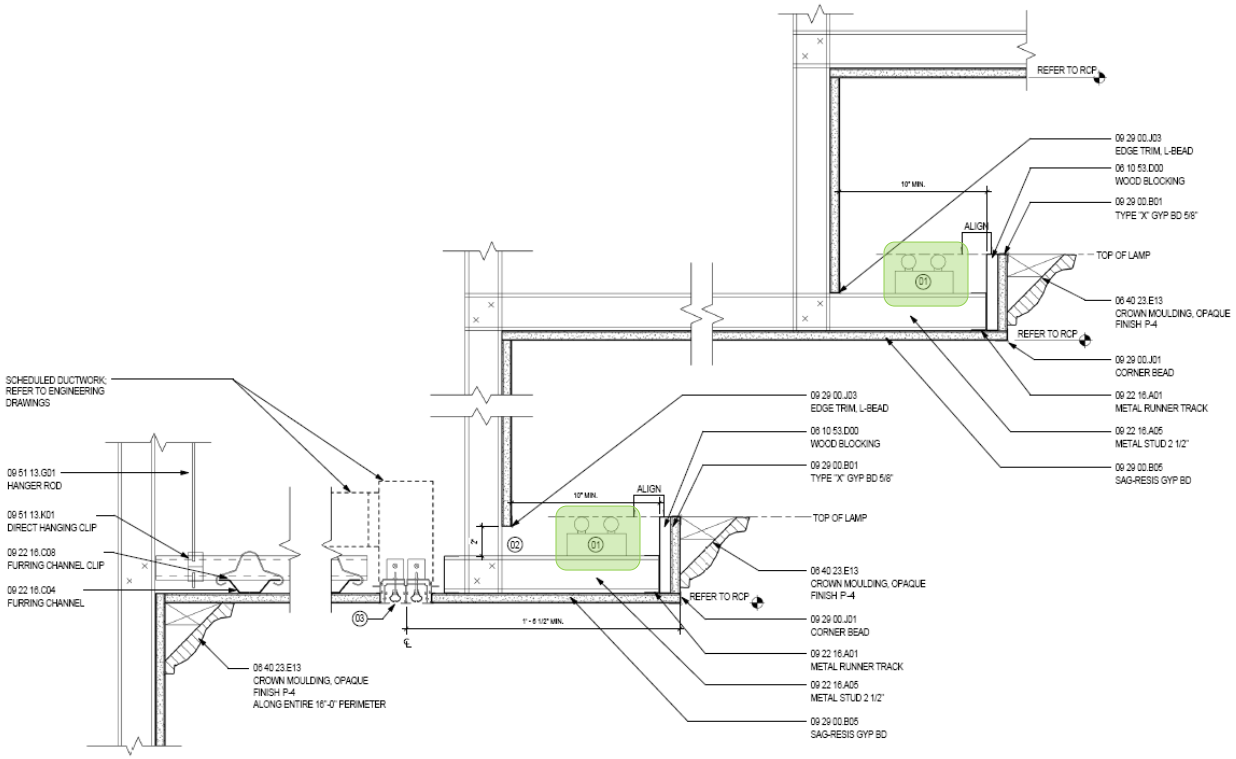

Figure 55: Cove Lighting Section in Ballroom

Existing Luminaire Schedule | Ballroom									
Fixture Type	Manufacturer	Description	Catalog No.	Lamps		Volts	Ballast	Mounting	Notes
				No.	Type				
F3	Interieurs	Decorative chandelier with a gold, topaz organza lampshade	Belle-Ile Chandelier	12	F26TBX/SPx30 GE	120	--	Surface	
F14	Bellacor	Prefunction Lobby Sconce	Princess Drum	2	40B11C/HAL/BL	120	--	Wall	Ballroom
F32	Lightolier	6" recessed halogen accent light with (1) PAR38 60W lamp	C6P38DWHW/C6DAIC-MG8	1	60PAR38FL (60Watt)	120	--	Recessed	IBEW, IC Rated, UL Listed for damp location, suitable for IC environments
F36	Lightolier	Surface-mounted fluorescent strip light, rigid housing with (1) F32T8 lamp	SS-4-S-1-32-HILUME-MG8	1	F32T8/SPX30 G.E.	120	Integral HPF Lutron Hilume	Cove	Contractor to coordinate mounting in coves.
F51	ETC	Recessed retractable lighting position with (4) 20A parallel blade connectors wired for 2 circuits	RLP-A/2 Circuit	--		120	--	Provide support	Coordinate meeting with ceiling and provide 2 ckts wired to dimming system
F56	Lightolier	6" recessed halogen accent light with (1) PAR38 60W lamp, white cone and flange	C6P38AWHW/C6DAIC-MG8	1	60PAR38FL/HIR/FL GE	120	--	Recessed	Ballroom recessed halogen accent light

Table 12: Existing Luminaire Schedule | Ballroom

Daylighting Elements:

There is currently no daylighting in the ballroom, as it has no exterior views and is inside the Conference Center.

Control Devices:

The ballroom is equipped with a four scene preset dimming system, including audio visual interfaces and partition controls.

Ballroom | Design Considerations and Criteria

Lighting Design Criteria and Considerations

(IESNA Lighting Handbook – Interior > Dance Halls/Discotheques > Ballrooms/Social Events)

- **Psychological Aspect:**
  The Ballroom can create many different impressions, depending upon the function during the given time. For instance, a more public feel could be utilized during a company or university event, such as a conference, meeting, or networking reception. Having more of a general ambient light in the Ballroom during these types of functions seems necessary. Themed parties, dances, or anniversary parties may have a festive atmosphere. This type of lighting could include the use of color, sparkle, and reflected highlights around the room.

- **Appearance of Space and Luminaires:**
  The Ballroom in the Hotel and Conference Center is the largest space available in the building for guests. As such, it is used to showcase the sophistication and uniqueness of the venue. By incorporating chandeliers, wall sconces, and other such decorative luminaires, the space will transform venues and create a chic design. The use of one or two supplementary systems would also be required to use during the more public events. It is also important to note that the use of partitions is possible, so the luminaire layout should be able to divide nicely into three separate spaces. The wood millwork around each of the doorways and crown molding in the ceiling coves can also be accented, as the details aid in the overall appearance of the Ballroom.

- **Color Appearance and Color Contrast:**
  The colors and finishes of the Ballroom match with the rest of the Hotel and Conference Center: warm and relaxing. Lamps with warmer CCTs should generally be utilized to uphold the character of the space and enhance the finishes and colors present. Warmer CRIs (greater than 80) should also be considered because of the possibility of fresh food being catered or served, the effects on people's skin, and even because of guests' choice in clothing patterns and colors.

- **Luminances of Room Surfaces:**
  Color and finish selections in the Hotel and Conference Center were thoroughly thought out and executed, as similar ones were selected for the Ballroom. Because of this, the lighting in the Ballroom should enhance the textures and colors.

- **System Control and Flexibility:**
  Lighting has a prominent effect and role during large events. Lights dimming or changing color, for example, signal to guests that an important event is starting or happening. The Ballroom should definitely employ a flexible control system for different scene presets. Being able to house various types of functions, the Ballroom will require different presets to accommodate for all of the venue options.

- **Light Distribution on Surfaces:**
  Uniform lighting on tables is critical during the more public events, for reading and writing purposes especially. A public atmosphere is achieved with higher levels of illumination and more uniform light distributed on both the horizontal and vertical planes. Having higher luminances on the workplane with peripheral emphasis will make the Ballroom appear more clear and open as well. Another lighting system can be employed during the more private events, with a non-uniform distribution and lower light levels. Emphasis on architectural features will draw guests' eyes towards these surfaces.

- **Modeling of Faces or Objects:**
  With the application of lamps with high CRIs, guests' facial features and skin tones will appear much more natural. The Ballroom is a public, social room that is meant for interaction, so vertical illumination is critical.

- **Sparkle/Desirable Reflected Highlights:**
  During the more festive activities in the Ballroom, such as themed parties or dances, sparkle is necessary to add to the excitement of the event. Decorative chandeliers can be used in the room to add sparkle to the space.

- **Horizontal Illuminance:**
  A horizontal illuminance is recommended in Category "B", **5fc**.

- **Vertical Illuminance:**
  A vertical illuminance level in Category "A", **3fc,** is recommended.

- **Power Density Allowance: ASHRAE 90.1.2007**
  - Convention Center > Exhibit Space = **1.3W/SF**
  - Additional Interior Lighting Power – In addition to the installation of general lighting, decorative lighting is permitted (chandeliers, sconces, or for highlighting features) as long as it does not exceed **1.0 W/SF**.
  - Total allowable = **2.3 W/SF**

Ballroom | Evaluation and Critique

The Ballroom is a very elegant and sophisticated room in the Hotel and Conference Center. The atmosphere may change depending on the function taking place inside, but the stylish coves and decorative pendants and sconces really carry the theme of relaxation through the entire space. The fixtures go well with the décor of the ballroom and enrich the colors and textures.

Having a dimming system and scene presets will really enhance the space for the variety of events and how light can interact with people and the room. As shown in Figure 56, a general ambient light is given off from the coves. This type of a setting is for a business reception of some sort. The illuminance values on the floor are relatively high compared to the criteria, but depending on the event, may be necessary. Having more of an indirect lighting system also heightens the space and gives it a more pleasant atmosphere.

The distribution of light on the surfaces is definitely sufficient for the business function in Figure 56. The exterior walls are receiving about 26fc of light (Figure 57), making the room appear brighter and more public.

The decorative chandeliers and accent lights are what really highlight the Ballroom. While the chandeliers are a classic touch of detail to the rest of the millwork and furnishings, the accent lights create sparkle around the room,

The Ballroom did not quite make the code set out in ASHRAE 90.1. Using more efficient lamps in turn could decrease it. However the halogen lamps do prove beneficial to the modeling of facial features and color appearance.

Light Loss Factors:
**Use of the new procedure to find LDD was used. As the new handbook does not address RSDD, it was not calculated below. According to the new handbook, a LEDs LLD is now 0.7. A 12 month cleaning interval and "clean" environment was assumed.*

Light Loss Factors | Ballroom				
Fixture Type	LLD	LDD	BF	Total LLF
F3	0.85	0.94	0.92	0.74
F14	0.60	0.90	--	0.54
F32	0.90	0.94	--	0.85
F36	0.91	0.94	0.98	0.84
F51	--	--	--	--
F56	0.90	0.94	--	0.85

Table 13: Light Loss Factors | Ballroom

LPD | Ballroom				
Fixture Type	Quantity	Watts/Luminaire	Watts/LF	Total Watts
F3	4	348	-	1392
F14	16	80	-	1280
F32	40	60	-	2400
F36	184	32	-	5888
F51	-	-	-	-
F56	28	60	-	1680
			Total Watts	12640
			Total W/SF	**2.34**

Table 14: LPD | Ballroom

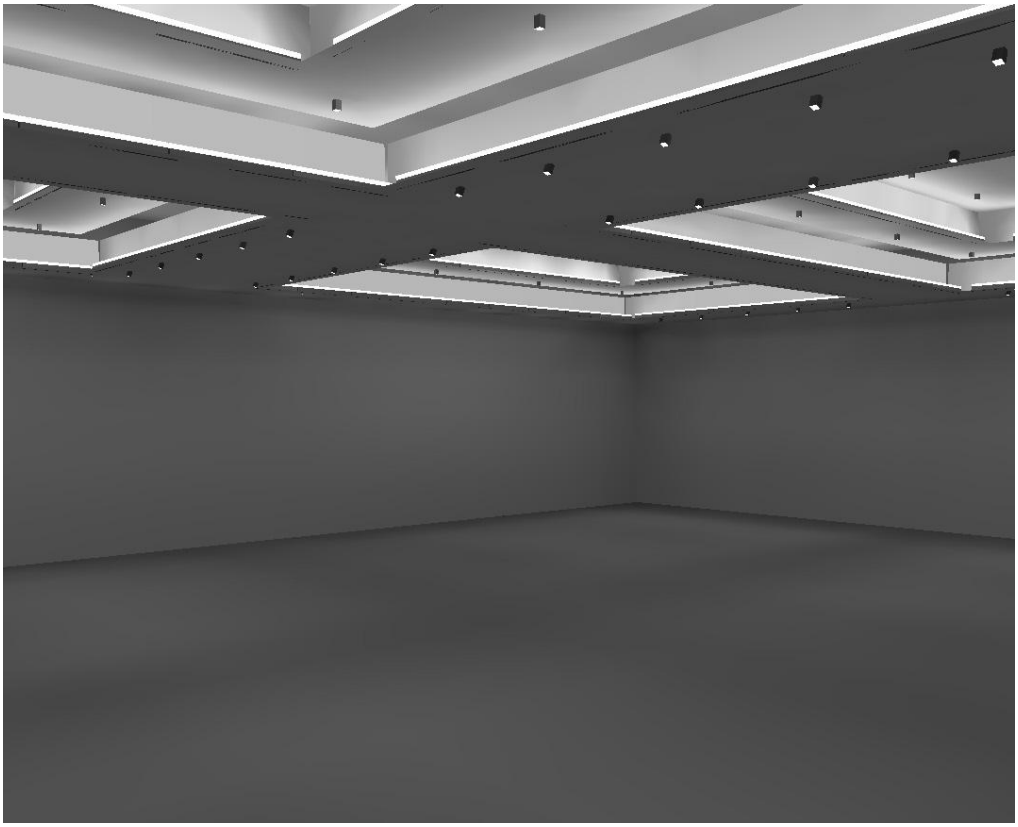

Figure 56: Rendering of the Ballroom

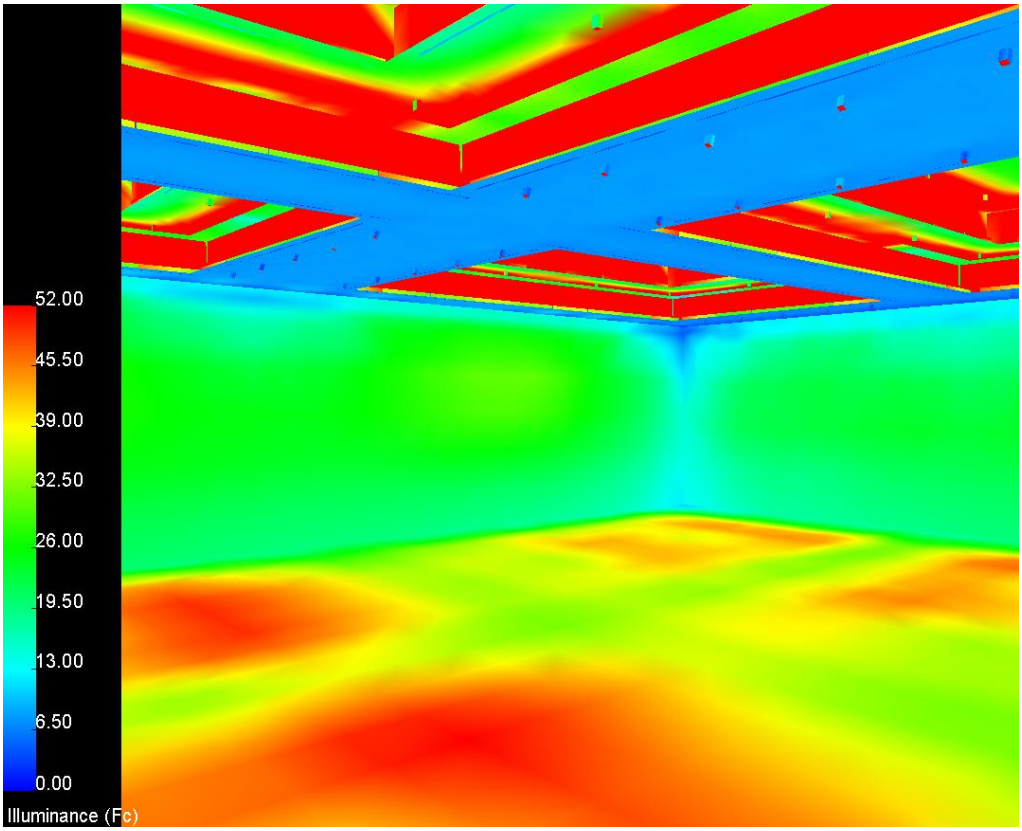

Figure 57: Pseudo Color Diagram of the Ballroom

Maximum Illuminance	*Average Illuminance*	*Minimum Illuminance*
52.8fc	33.95fc	13.4fc

Table 15: Illuminance Values | AGI32

General Lighting Evaluation and Critique

The Hotel and Conference Center in Virginia has a distinct, urbane atmosphere. It is seen through the architecture and the finishes, but more importantly, the light. Light initially draws guests into the Main Lobby from outside, as it glows with warm light. Special care and attention was on all facets of the architecture and how the building was going to orient guests. Through the use of coves, branding walls, decorative luminaires, and accent lights, guests feel welcome and relaxed. The light remains on the peripherals and away from the guests.

The most common lamp is halogen. Halogen lamps not only render colors better, but the rich hues and finishes in the building were enhanced with this warm light. Although halogen lamps do not have that high of a life, they are easily dimmed, making them ideal for the building. Dimming systems are implemented in the Main Lobby, the Lounge, and the Ballroom alike. Also, warmer lamps were specified to help create a relaxing environment throughout the building.

According to the IESNA recommendations, the existing luminaire layouts provide the recommended levels of light on the workplanes of each space. ASHRAE 90.1.2007 levels were also, for the most part, met in the rooms.

Overall, the lighting design in the Hotel and Conference Center is a great solution. With the use of warm colors on the furniture, innovative ways to highlight signage and accentuate millwork, and decorative fixtures, the Hotel and Conference Center promotes relaxation and elegance.

**Note, all photographs and renderings are courtesy of Horton Lees Brogden Lighting Design and Nic Tan*