

Technical Report #1

Ryan Wise
Lighting/Electrical
Dr. Mistrick
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Newseum and Freedom Forum Headquarters

Washington, D.C.



* AGI files on P drive at P:\rmw210\senior_thesis\tech1

Executive Summary

The purpose of technical report one is to look at and analyze existing lighting conditions in the Newseum and Freedom Forum Headquarters building. Four spaces to be looked at are a special purpose space, a large work space, a circulation space, and an outdoor space. They are the News History Gallery, Freedom Forum offices, the welcoming area/foyer, and the Newseum entry porch area respectively.

First information regarding the lighting system was gathered. This includes luminaires, lamps, ballasts, and control devices. Information regarding the spaces was also gathered. This includes materials and reflectances, dimensions, furnishings, and any details such as artwork or other areas of interest. Plans, sections, and lighting plans are also included in the report.

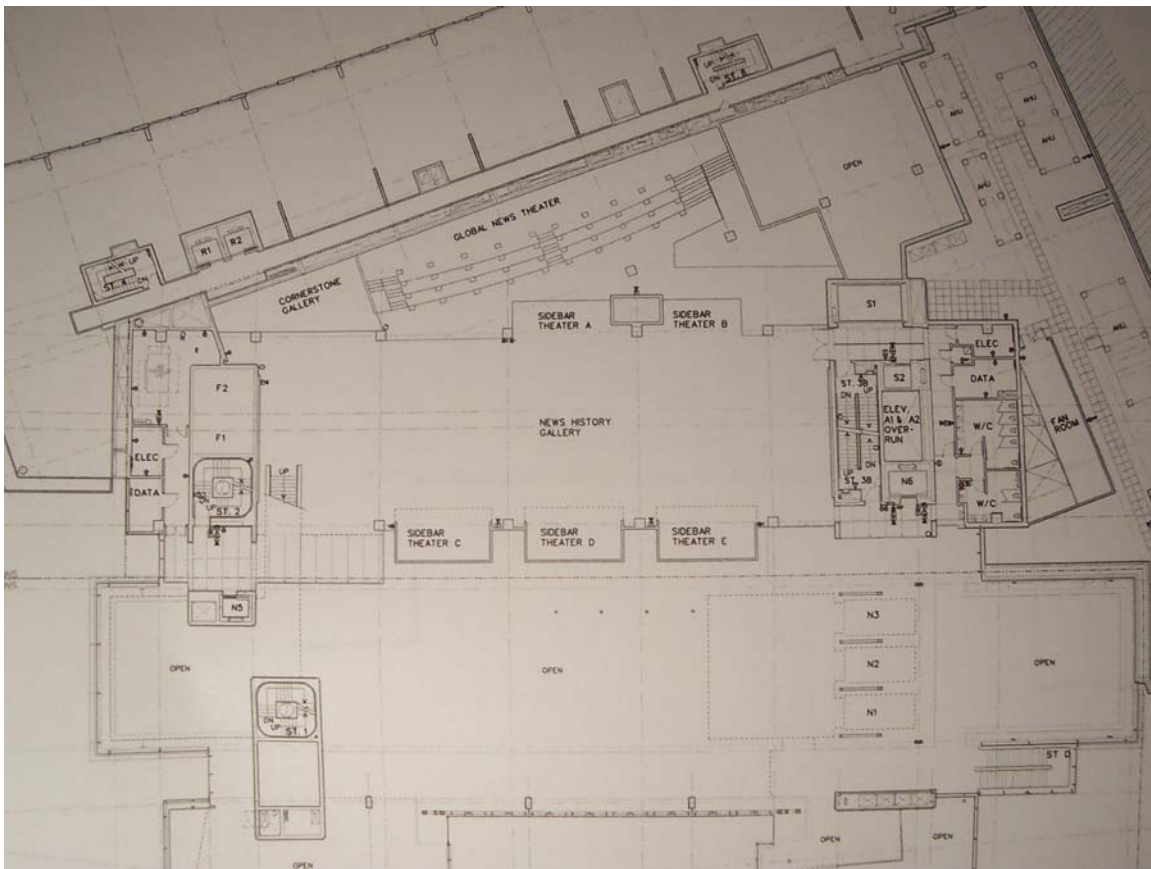
After documenting the system information, a list of design criteria was produced. These include psychological aspects, aesthetics, power allowances, and lighting levels. While producing this list, the IESNA Lighting Handbook and ASHRAE 90.1 standards were used.

The final step was to analyze the existing lighting conditions. This was done with the help of AGI. Light levels were calculated and the overall look and performance was compared to the list of design criteria.

News History Gallery

Overview

The News History Gallery shows off the Newseum's collection of historic news articles ranging back to the 18th century. They come from newspapers and magazines. The center of this gallery, called the timeline, is devoted to showcasing these documents. Another focus of this gallery is to showcase the journalists and technology that was used to spread news over the years. The outer walls of the gallery contain cases which hold these artifacts and memorabilia. The gallery is approximately 6800 sq. ft. and is located on the fourth level.



Level 4 plan – News History Gallery

Lighting

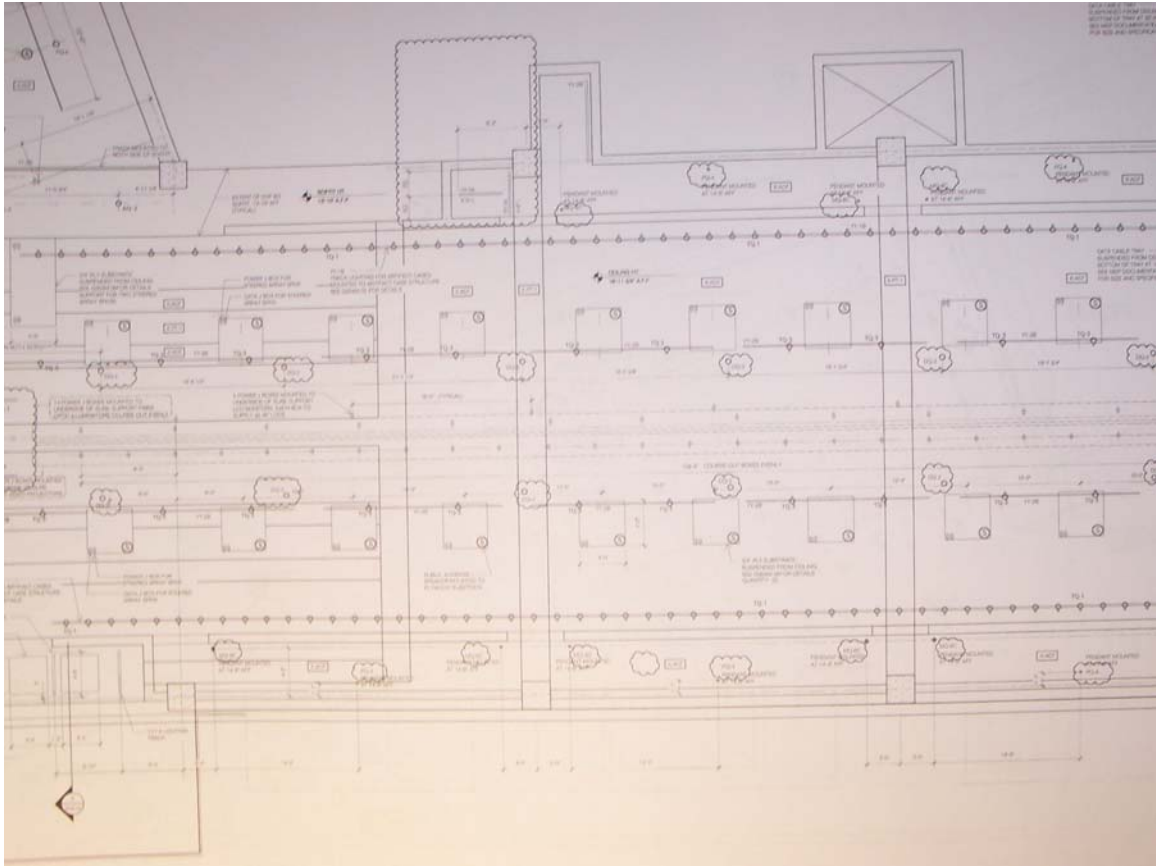
The lighting in this gallery is composed of two main parts. Three kinds of track accent lighting is used around the room. TQ-1 is used on the outer wall exhibits, while TQ-3 is used in the middle for the timeline. 8” recessed down lights are used in the “walking space” throughout the exhibits to contribute a low ambient light level. In the corridors behind the galleries leading to the sidebar theatres, two pendant mounted fixtures are used. Overall, the space has a low light level with the accent lighting drawing the guests attention to the exhibits.

Luminaire Schedule

Symbol	Description	Lamp	Watts	Volts	Mounting	Ballast	Quantity
AQ-2	4” Adjustable accent	halogen	75	120	recessed	-	11
DQ-2	8” downlight	halogen	75	120	recessed	-	16
MQ-6C	Downlight	halogen	75	120	Pendant	-	8
PQ-4	Downlight	halogen	75	120	Pendant	-	5
TQ-1	Track head	PAR36	50	120	Track	-	115
TQ-3	Track head	PAR36	75	120	Track	-	28
TW-1	Track head	PAR36	75	120	track	-	8

Controls

The lighting in the News History Gallery is broken down into 5 zones. The track lighting for the exhibits is strictly on/off. Each exhibit case has it’s own switch. The recessed down lighting and pendant lighting are dimmable in order to change ambient light levels of the space.

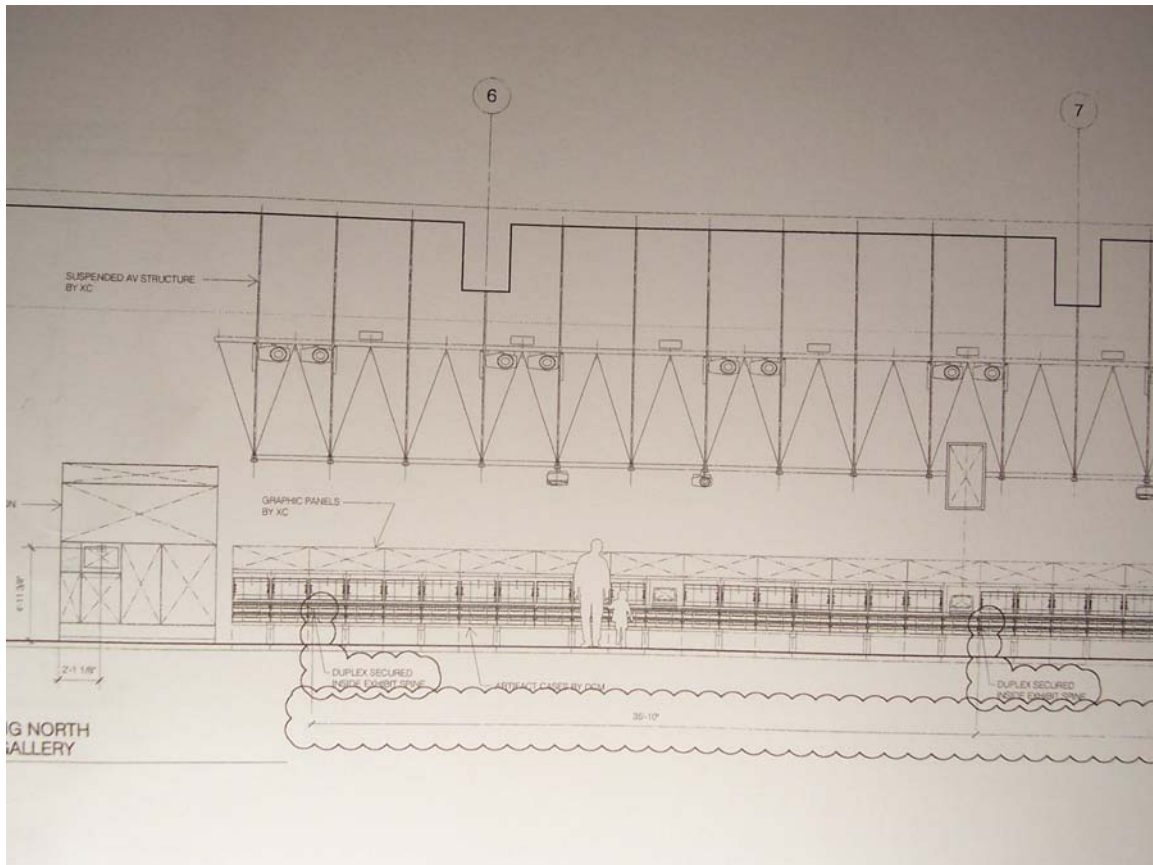


News History Gallery-Lighting Plan

Room Details

- The ceiling is a powder coat paint finish. The color is matte black and has a reflectance of 7. A two inch acoustic spray of the same color and reflectance covers the MEP work.
- The walls are a matte black latex paint with reflectance of 7.
- A matte black vinyl flooring covers the floor. The reflectance is 8.
- A frosted mirror glass covers the display cases in both the outer and inner portions of the gallery.
- There are no furnishings in this space.

Sections



News History Gallery- section looking north

Power density

Symbol	Wattage x quantity	Total wattage	
AQ-2	75 x 11	825	
DQ-2	75 x 16	1200	
MQ-6C	75 x 8	600	
PQ-4	75 x 5	375	
TQ-1	50 x 115	5750	
TQ-3	75 x 28	2100	
TW-1	75 x 8	600	1.7 w/ft ²

Design Criteria

Illuminance:

The illuminance values recommended by the IESNA handbook are 10 fc horizontal (on the floors), and 5 fc vertical.

Power Allowance:

According to ASHRAE 90.1 standard, the power density allowance for a museum general exhibition space is 1.0 watts per square foot.

Controls:

The lighting system should be dimmable to allow the visitors to focus their attention to the exhibits instead of the space around them. There should also be separate switching for the different display cases.

Points of Interest:

Each display case should have accent lighting and have more illuminance than the rest of the space. This can be done with track lighting. Another area that should be accented is the entrances to the gallery. Visitors should easily be able to find their way to exits.

Reflected Glare:

Reflected glare could be a problem at the glass surrounding the display cases. To avoid this, make sure accent lighting is coming from the side, or inside the case.

Shadows:

It is important to avoid shadows on the items in the cases. They could be caused by seams in the glass. A way to avoid this is make sure the accent lighting is placed in a location so the beam will avoid transmitting thorough the seam.

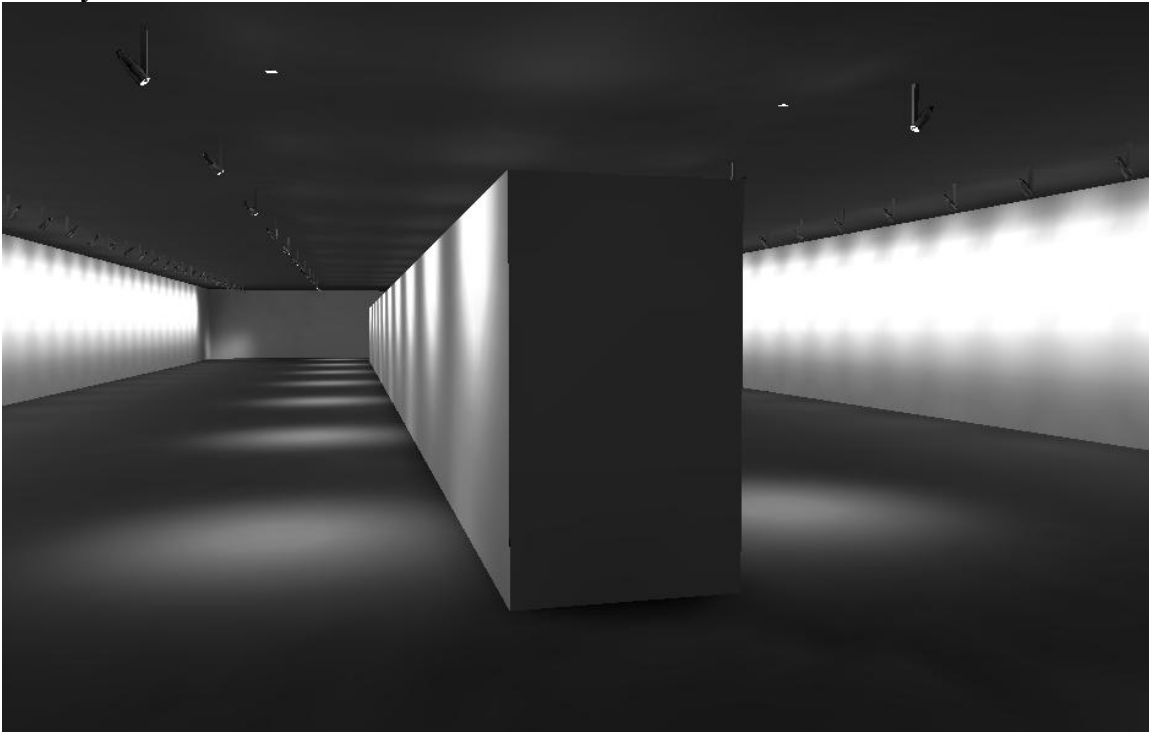
Modeling of objects:

It is very important to have good modeling of objects in this space. The objects in the exhibits should be very well illuminated so visitors can see them well, and see detail well. One consideration is to not use lamps that might damage or fade the paper of the old articles.

Psychological aspects:

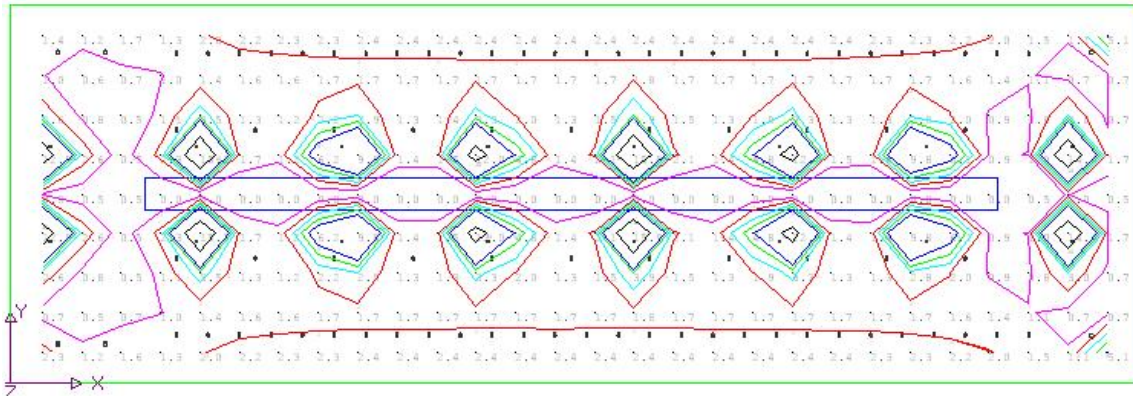
Since this gallery deals with history, the use of a low CCT (yellow light) could make the visitors feel like they are in a more historic environment. Fixtures from different times in history could also be used at different locations in the gallery as the timeline of news articles progresses.

Analysis



Gallery Rendering

Gallery footcandle isolines

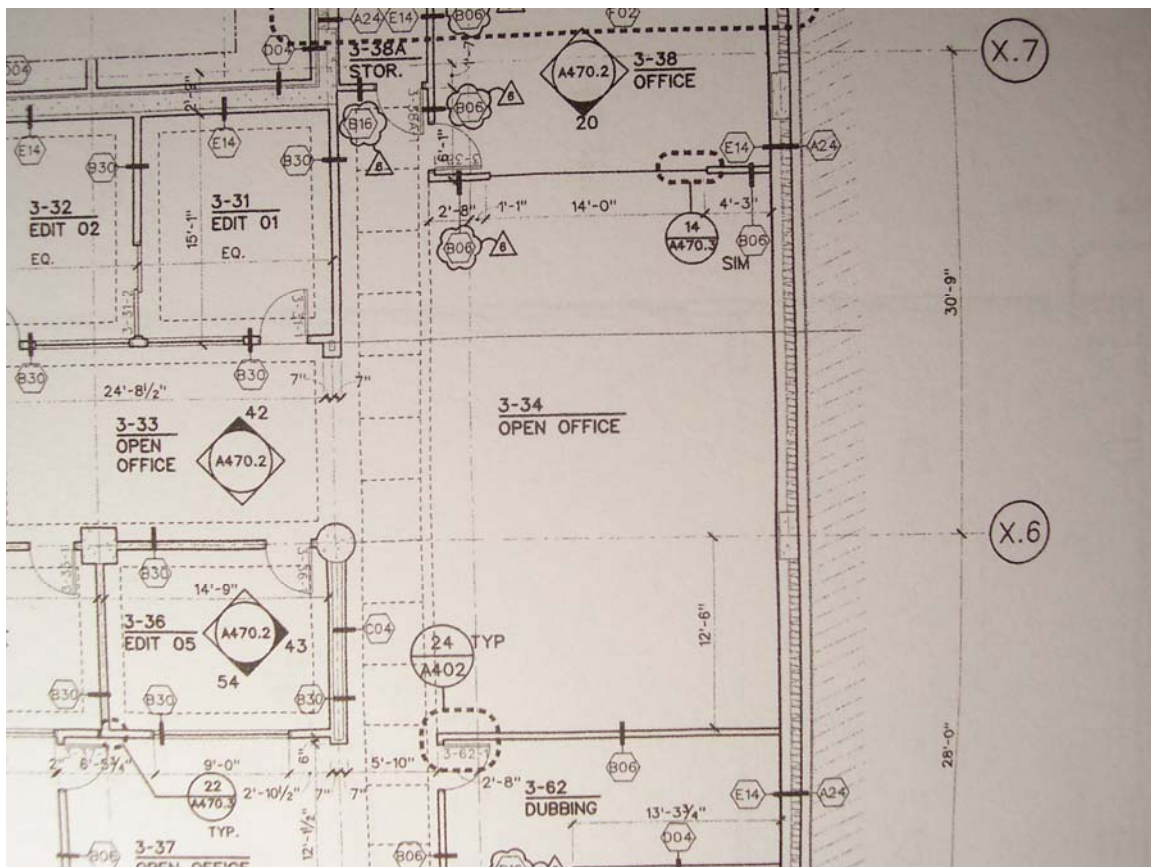


According to the AGI calculations, the horizontal footcandle values on the floor are 2.5. That is below the recommended of 10 fc. That will be enough though for visitors to walk around. Additional light will come from reflectances off of the artifacts and articles. The rendering shows how the display cases will be much more illuminated that the surrounding spaces. This will help the exhibits to stand out. It isn't really necessary to have the downlighting be on a dimming control. With the accent lighting in such a close row, there could be some reflected glare. Depending on the tilt angle the glare would have more of an effect on small children or more on adults. It could be a consideration to use all incandescent lights in the space to give it more of a warm feel with the yellow glow. Careful selection of different types of lamps and luminaires is required because the calculated power density is 1.7 watts per square foot while the allowance is 1.0.

Freedom Forum Offices

Overview

The Freedom Forum Offices are where members of the Freedom Forum work to keep all aspects of the Newseum running smoothly. Tasks range from administrative to research. Computer use is the majority of work that is done in the offices. The plan is open and blends into the corridor space without walls. This particular office is approximately 1,050 sq. ft and is located on the third level.



Level 3 plan – Freedom Forum Offices

Lighting

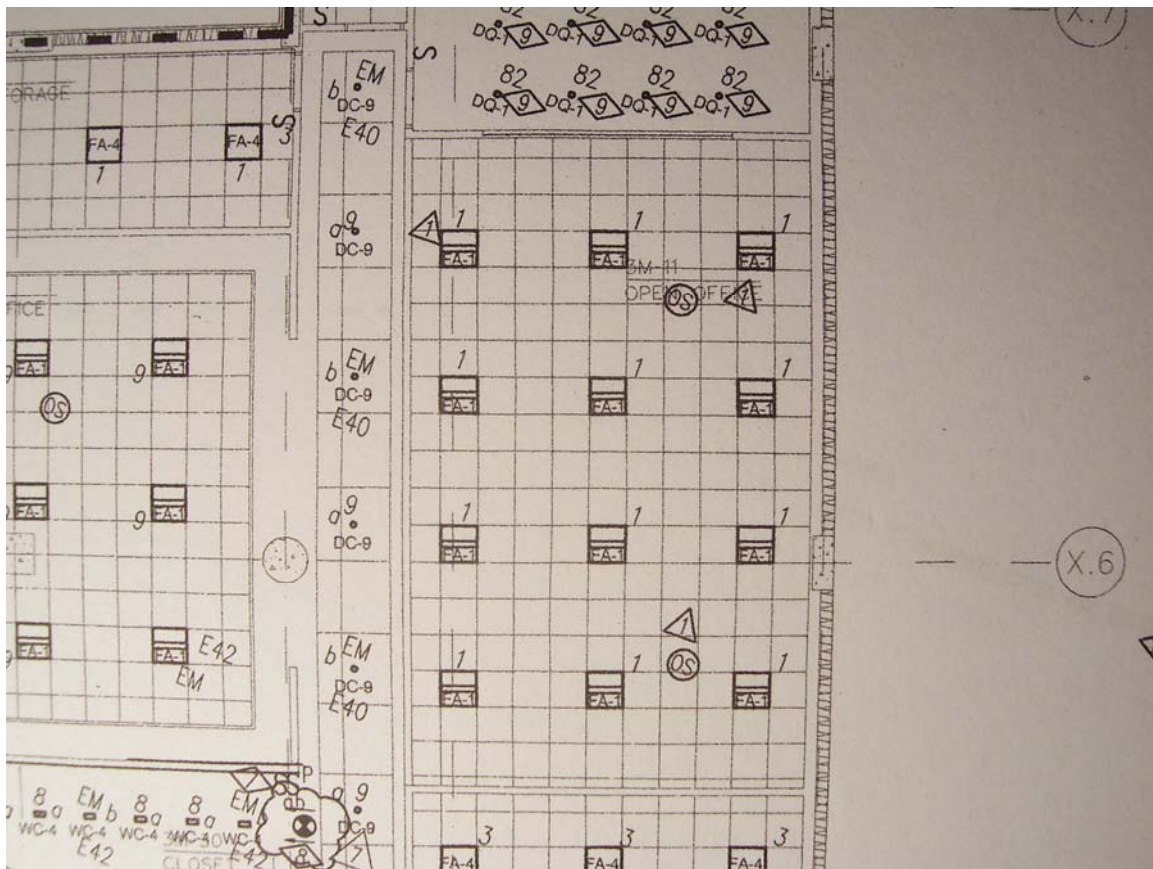
Lighting for the offices should have a focus of visual clarity. The lighting in the office is direct/indirect 2x2 recessed fluorescent lighting in the cubicle area. In the corridor space, recessed downlighting is used. It must be a VDT compliant lighting system.

Luminaire Schedule

Symbol	Description	Lamp	Watts	Volts	Mounting	Ballast	Quantity
DC-9	6" downlight	halogen	50	120	recessed	-	5
FA-1	2x2 troffer	(3)T8	17	120	recessed	electronic	12

Controls

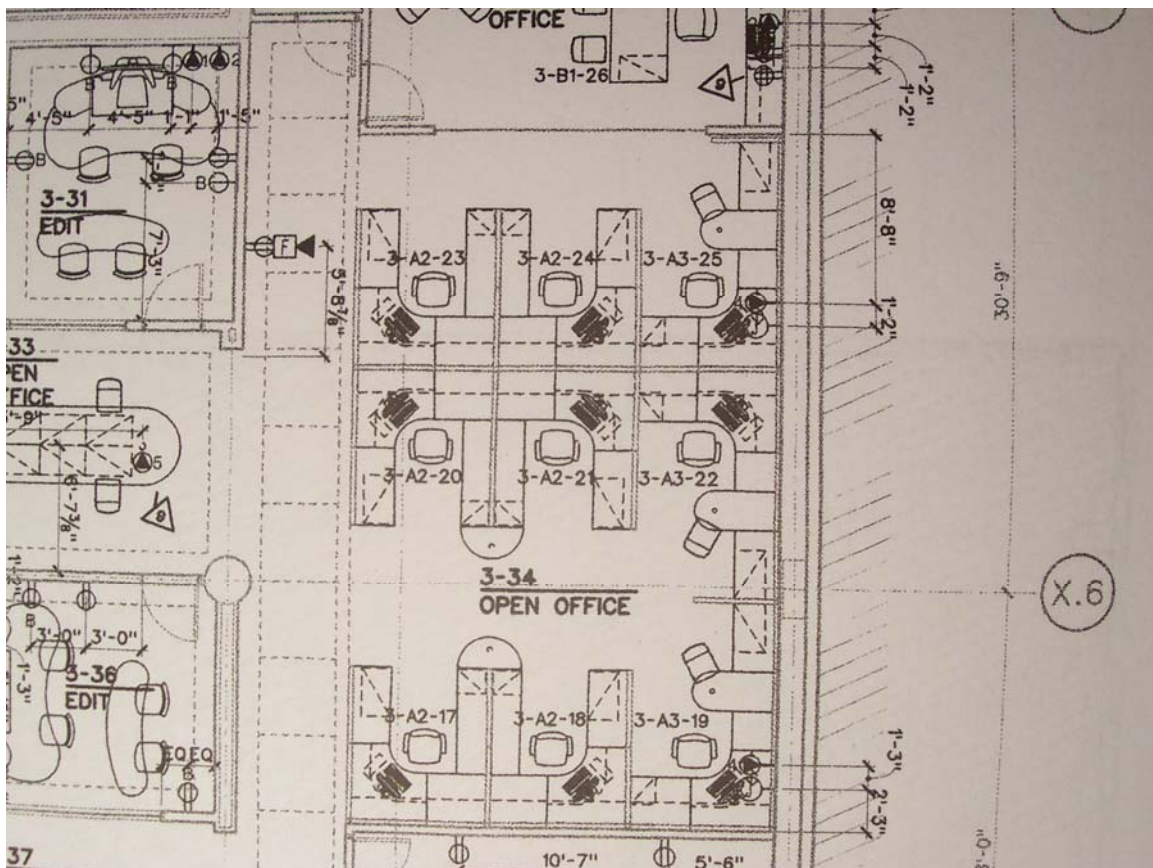
The control system for the office has motion sensors incorporated to avoid wasting energy when workers are not in the room. There are also daylight sensors so the lighting doesn't have to be on at full power all day.



Freedom Forum Offices-Lighting plan

Room Details

- The ceiling is white acoustical ceiling tile with a reflectance of 95.
- Walls are painted gypsum wall board
- 2 windows are on the east wall
- Cubicle partitions are use with a reflectance of 60.
- The floor is grey carpeting and has a reflectance of 25.
- Furnishings in the office include mounted desks, office chairs, and cubicle partitions



Freedom Forum Offices-Furniture plan

Power density

Symbol	Wattage x quantity	Total wattage	
DC-9	50 x 5	250	
FA-1	(3) x 17 x 12	612	0.82 watts/ft ²

Design Criteria

Illuminance:

The IESNA recommended illuminances for an office is 30 horizontal fc and 5 vertical fc.

Power Allowance:

According to ASHRAE 90.1 standard, the power density allowance for an open office space is 1.1 watts per square foot.

Luminance Ratios:

The task area should have a luminance ratio of 3:1.

Controls:

An open office should use motion sensors to avoid lighting system operation when the room is not in use. Daylight sensors could also be used.

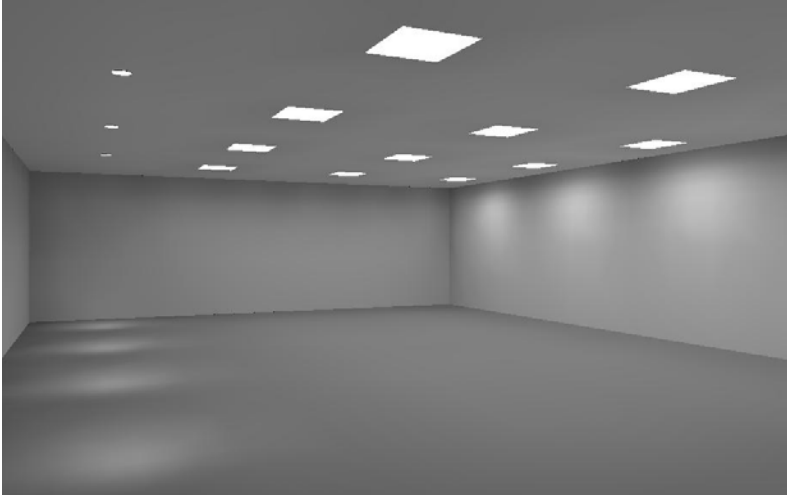
Reflected glare:

Reflected glare will be a problem in an office with VDT use. One way to limit this is to use an indirect lighting system.

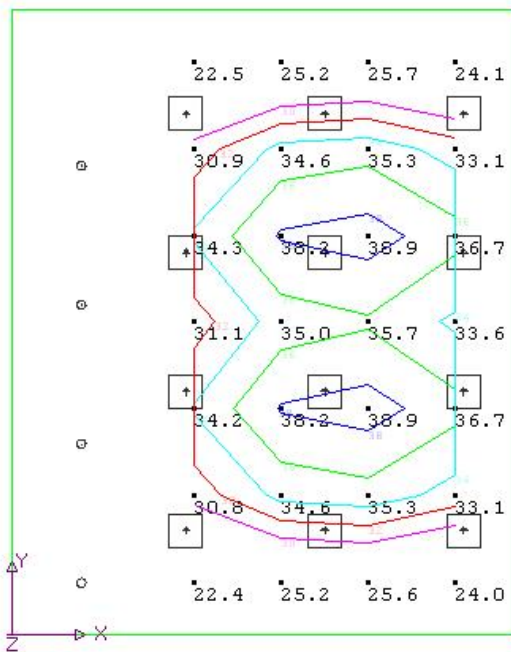
Visual Clarity:

An office space should have a visual impression of visual clarity. One way to achieve this is to have a uniform lighting system.

Analysis



office rendering



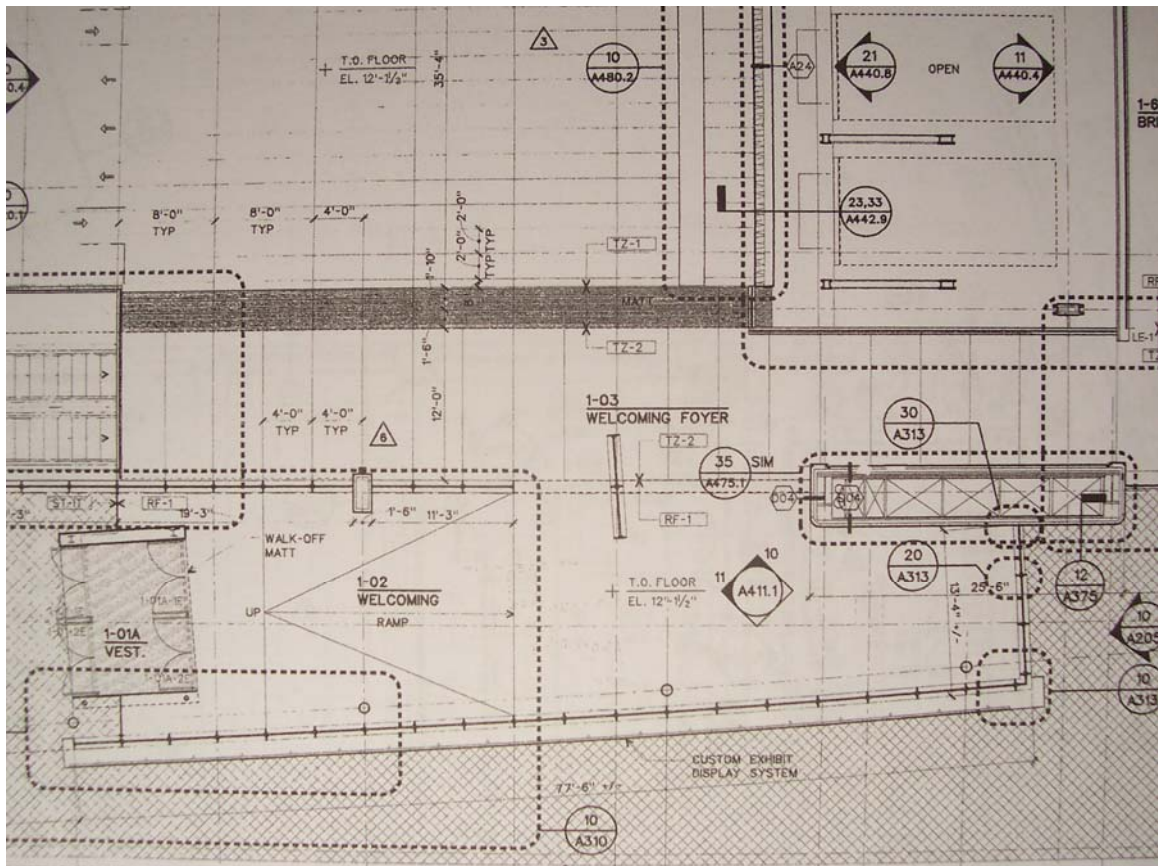
The existing Freedom Forum office performs well in horizontal footcandles at the work plane. The average in the cubicle area is 31.9 fc,

which is very close to the recommended value of 30 fc. The calculated power density is only 0.82 w/ft² which is under the limit of 1.1. Luminaires such as wall washers could be added to the space to give it more dimension and character. Reflectance in the VDT's should not be much of a factor because the existing system is a direct/indirect system. Visual clarity is also achieved in this design, because there is a uniform system with uniform light levels.

Welcoming Area

Overview

The welcoming area is where every guest begins their journey in the Newseum. It has a very inviting feel to it. When they enter the building from Pennsylvania Avenue, people enter into the welcoming lobby. In this area, guests can buy tickets, become oriented with the buildings layout, and watch televisions showing real-time news headlines. The welcome area is approximately 2100 square feet.



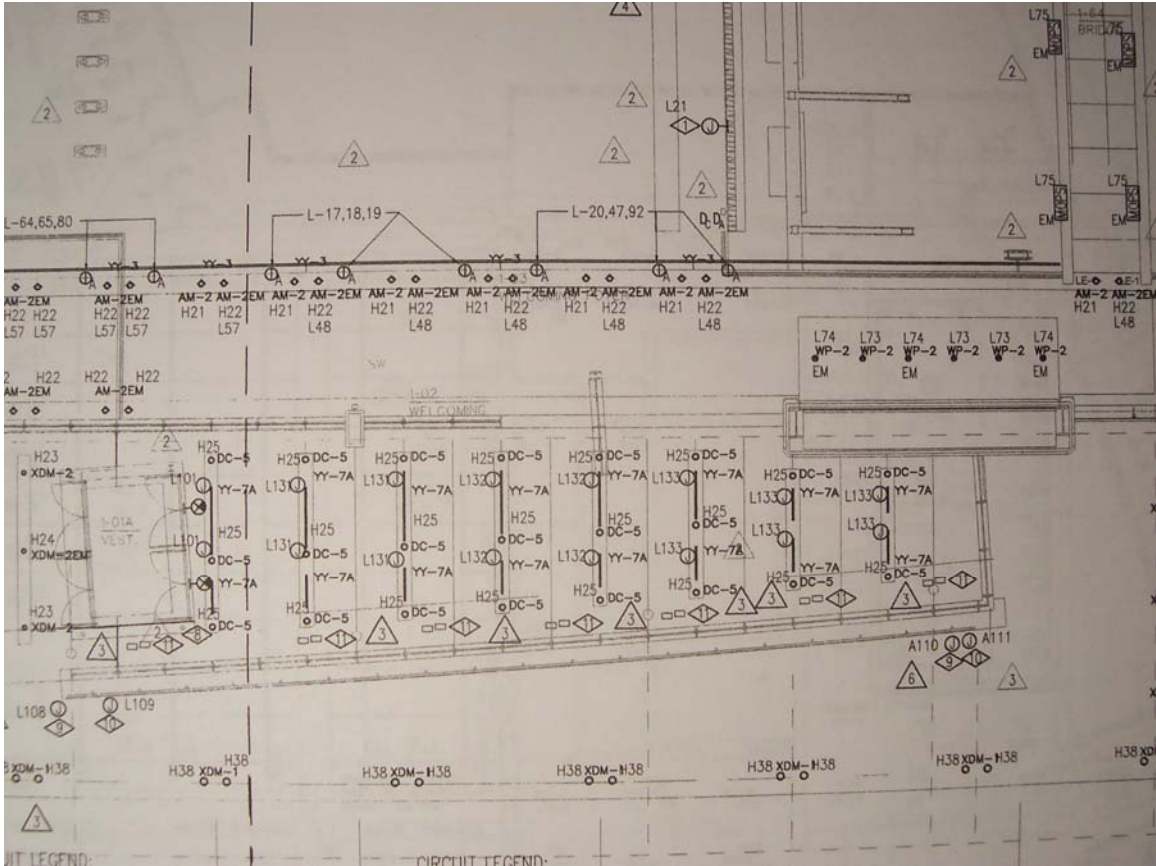
Level 1 plan – Welcoming area

Lighting

The lighting in the welcoming area creates a pleasant atmosphere for the first place guests will be in the Newseum. It consists mainly of recessed downlighting. Daylighting also plays a major role in the welcoming area. The south walls are glass curtain walls looking out to Pennsylvania Avenue. A set of accent wall washers highlight a portion of the south wall where a building map/directory is located.

Luminaire Schedule

Symbol	Description	Lamp	Watts	Volts	Mounting	Ballast	Quantity
AM-2	Downlight	halogen	44	277	recessed	-	14
DC-5	Downlight	Halogen	48	277	Recessed	-	22
WP-2	Wall wash	halogen	75	277	Recessed	-	6



Welcoming area- lighting plan

Room Details

- The ceiling is a matte black paint finish with a reflectance of 7.
- The walls are painted gypsum wall board
- South walls are curtain glass wall with a base of stone
- Floor is grey carpeting with a reflectance value of 25
- Furniture includes an information desk along the east side of the room.

Power Density

Symbol	Wattage x quantity	Total wattage	
AM-2	44 x 14	616	
DC-5	48 x 22	1056	
WP-2	75 x 6	450	1.0 watts/ft ²

Design Criteria

Illuminance:

The IESNA recommended illuminances for a museum lobby is 10 horizontal fc and 3 vertical fc.

Power Allowance:

According to ASHRAE 90.1 standard, the power density allowance for a lobby is 1.1 watts per square foot.

Controls:

The welcoming area should integrate daylight sensors into the switching since the whole south wall is glass.

Reflected glare:

Reflected glare can be a problem with the television screens showing news headlines. Also make sure any pendant luminaires do not block the view of the screens.

Points of interest:

The welcome area has many points of interest. One is the information desk. The wall should be washed behind the desk to highlight the area and show visitors where to go. The stone base of the south wall could be grazed to bring out a different texture in the space. Structural columns in the space are an architectural element which could be highlighted.

Modeling of faces:

Make sure there is proper vertical illuminance to be able to see people's faces properly. This space is used as a meeting/gathering space before going off into the Newseum.

Aesthetics:

Create a modern looking space to go along with the modern exterior of the building. This can be accomplished with cooler CCT's and using LED's. Kinetic lighting is another possibility to add to a more contemporary design.

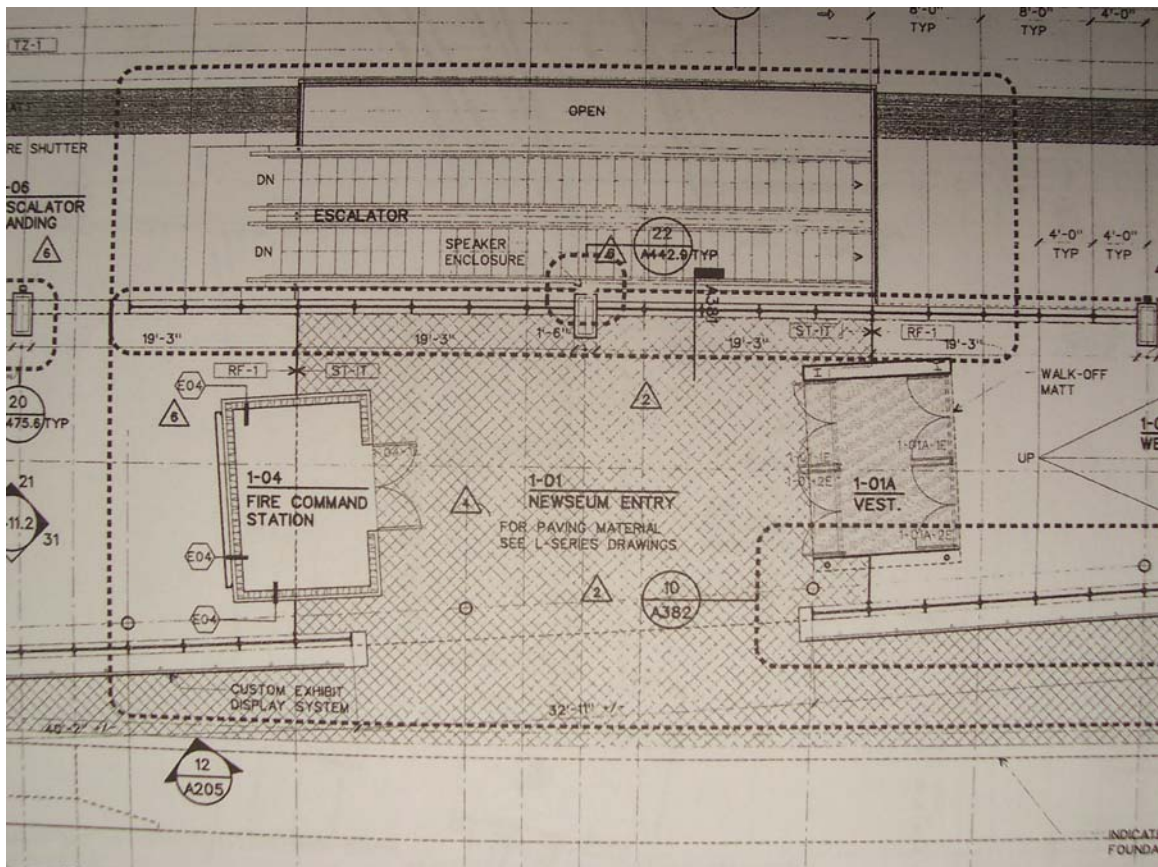
Analysis

From the plans and a site visit, the majority of lighting in the welcome area is recessed downlighting. That works because daylighting is a major factor. Accenting some points of interest would be a good idea though, to add more character to the space. Accent lighting could be placed on the structural columns to emphasize the architecture. It should also be placed at or behind the information desk to guide visitors and let them know it is there. The stone base of the south (outside) wall would also be good to highlight because it would emphasize a different texture in the space. Daylighting definitely provides the recommended IESNA illuminance values during the day, and the down lights are sufficient in the evening. Since the power is already at 1.0 w/ft² out of the allowable 1.1, it may be difficult to add the additional accent lighting. One way to take care of this would be to replace the downlights with a lower wattage fixture.

Newseum exterior porch entry

Overview

The Newseum entry porch is what draws people to the building from off of Pennsylvania Avenue. It is a transition from the sidewalk to the interior of the Newseum. The glass façade walls can allow pedestrians walking by to look in and become interested in what is going on inside. This area should not only appeal to Newseum guests, but also to people walking by. Because it has a roof, it can be a place to take cover in precipitation. It is important that any lighting used doesn't draw attention away from existing monuments along Pennsylvania Avenue. It is approximately 910 square feet.



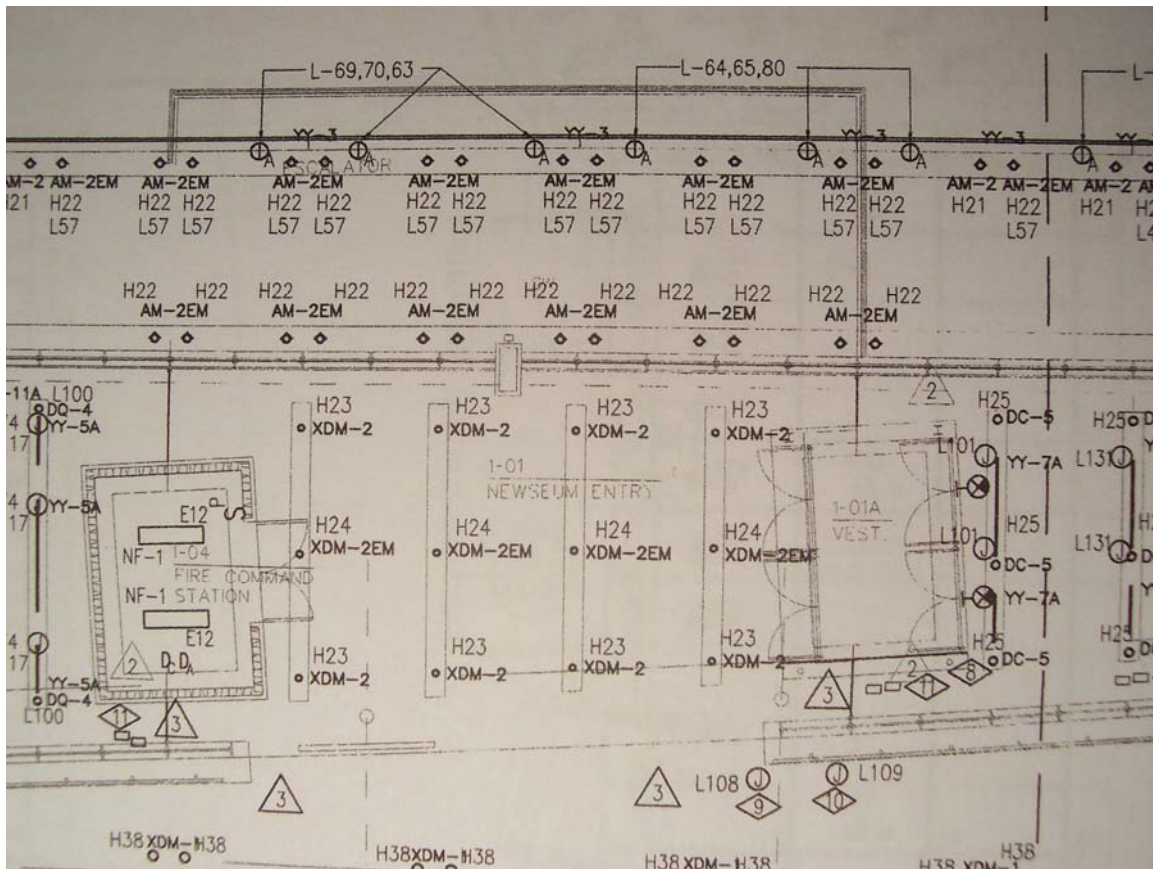
Level 1 plan – Entry

Lighting

The lighting for the entry porch is exterior down lighting. It creates enough illumination for and exterior entrance, but at the same time allows the majority of the attention be from the inside transmitting out through the glass. Simple down lights were chosen so the Newseum wouldn't just have a grand entrance, but so the Newseum is perceived as a whole and not individual parts.

Luminaire Schedule

Symbol	Description	Lamp	Watts	Volts	Mounting	Ballast	Quantity
XDM-2	Exterior downlight	Halogen	44	120	recessed	-	12



Entry porch – Lighting plan

Space Details

- Metal ceiling steel mesh panels
- Glass curtain walls against the rest of the building
- Stone pavers at the ground level
- No furniture for this space

Power Density

Symbol	Wattage x quantity	Total wattage	
XDM-2	44 x 12	530	0.6 watts/ft ²

Design Criteria

Illuminance:

The IESNA recommended illuminances for an exterior building entrance is 5 horizontal fc and 3 vertical fc.

Power Allowance:

According to ASHRAE 90.1 standard, the power density allowance for an exterior building entrance is 1.25 watts per square foot.

Light Pollution:

Avoid light pollution into the night sky. This can be done by having all luminaires aiming down, or installing shielding.

Appearance of Space:

The entry porch should be a pleasant space and draw people into it.

Points of interest:

The one main point of interest of the entry porch is the Newseum's front doors. These can be accented to guide visitors to the entrance.

Modeling of faces:

Make sure there is proper vertical illuminance to be able to see people's faces properly. The entry porch is also used as a meeting/gathering space for visitors before entering the Newseum.

Aesthetics:

Allow the lighting scheme for the entry porch to blend into that of the welcoming lobby. Use similar fixtures and similar CCT's.

Analysis

The downlighting of the entry porch will provide the needed illuminances specified by the IESNA handbook. It is important to keep the light levels lower than that of the inside lobby. At night the porch can act as a transition and give visitors time to adjust their eyes from the darkness of night to the illumination inside of the building. It would be a good idea to add LED's and possibly some kinetic form of light around the front entry. This will compliment the modern style of the architecture. As long as the additional lighting remains subtle, it will not take anything away from existing monuments nearby. This should not be a problem because you can not light the façade of a glass curtain wall anyway. The existing power density is only 0.6 watts per square foot. Since the allowable is 1.25, this gives space for the additional lighting previously mentioned.