



# **ASSEMBLIES PLAN REVIEW PROCESSES**

**2021 INTERNATIONAL BUILDING CODE | IBC**

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**BYRON KING, ASSISTANT DIRECTOR WITH  
DARRELL SHARP AND MICHAEL LAUCK  
HOUSTON PERMITTING CENTER  
PLAN REVIEW SUPPORT SERVICE TEAM**



# PURPOSE

together we create a strong foundation  
for Houston to thrive

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## 5 TO THRIVE VALUES

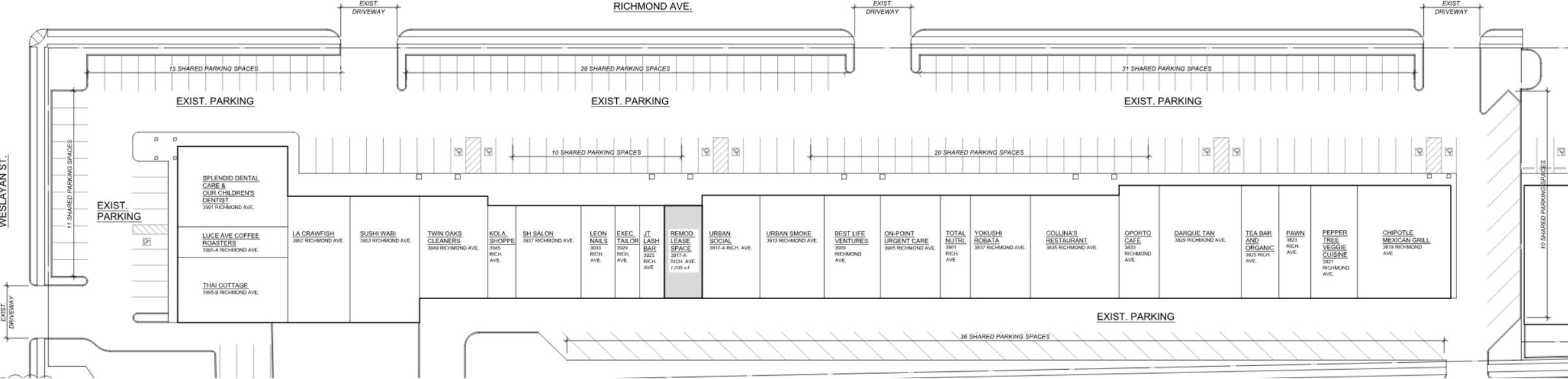
respect | ownership | communication | integrity | teamwork

# PRESENTATION OVERVIEW

- Occupant Load Factors
- Occupancy Classifications
- Sprinkler Requirements
- Exiting Requirements



# SITE PLAN



# RESTAURANTS & BARS

- **FIREWALL VS. FIRE BARRIER**
- **OCCUPANT LOADS**
- **SPRINKLERS**
- **EXITING**

# WHEN IS A FIREWALL VS FIRE BARRIER REQUIRED? SCENARIO 1

A non-sprinklered strip center is constructed of 5B construction.

A retail space has been proposed in a vacant space.

- *Is the Bar space permissible as proposed?*
- *What options does the customer have to meet the ratio requirements?*

# WHEN IS A FIREWALL VS FIRE BARRIER REQUIRED? SCENARIO 1

Per Section 508.4.2, the building area shall be such that the sum of the ratios of the floor area of each use divided by the allowable area for each use shall not exceed 1, referencing the unity formula.

Based on square footage values provided on the site plan for adjacent tenants, the formula yields a value of 1.2



# WHEN IS A FIREWALL VS FIRE BARRIER REQUIRED? SCENARIO 2

A non-sprinklered strip center is constructed of 5B construction.

A retail space has been proposed in a vacant space.

- *Is the Bar space permissible as proposed?*
- *What options does the customer have to meet the ratio requirements?*

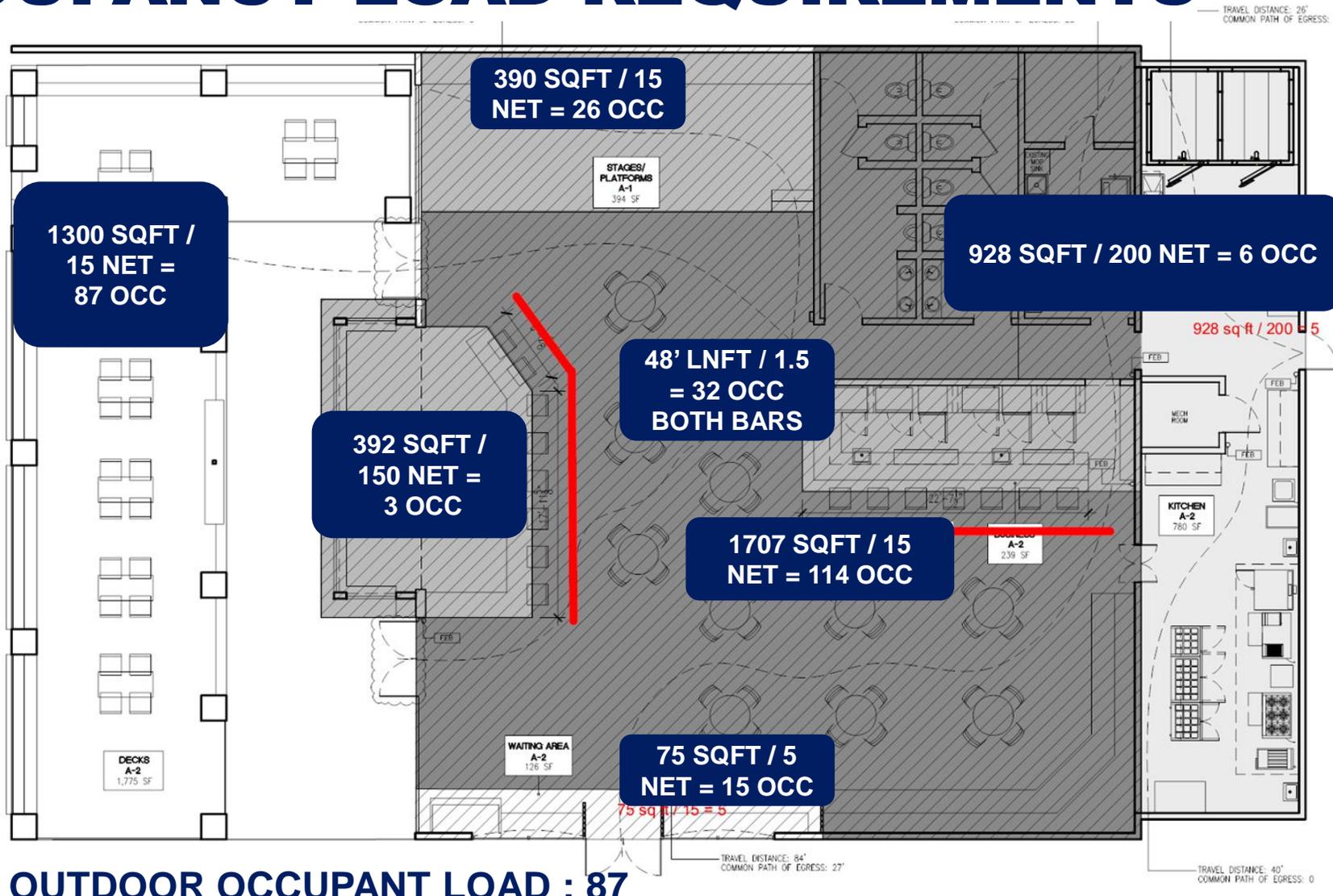
# WHEN IS A FIREWALL VS FIRE BARRIER REQUIRED? SCENARIO 1

Per Section 508.4.2, the building area shall be such that the sum of the ratios of the floor area of each use divided by the allowable area for each use shall not exceed 1, referencing the unity formula.

Based on square footage values provided on the site plan for adjacent tenants, the formula yields a value of .8



# A2 OCCUPANCY LOAD REQUIREMENTS



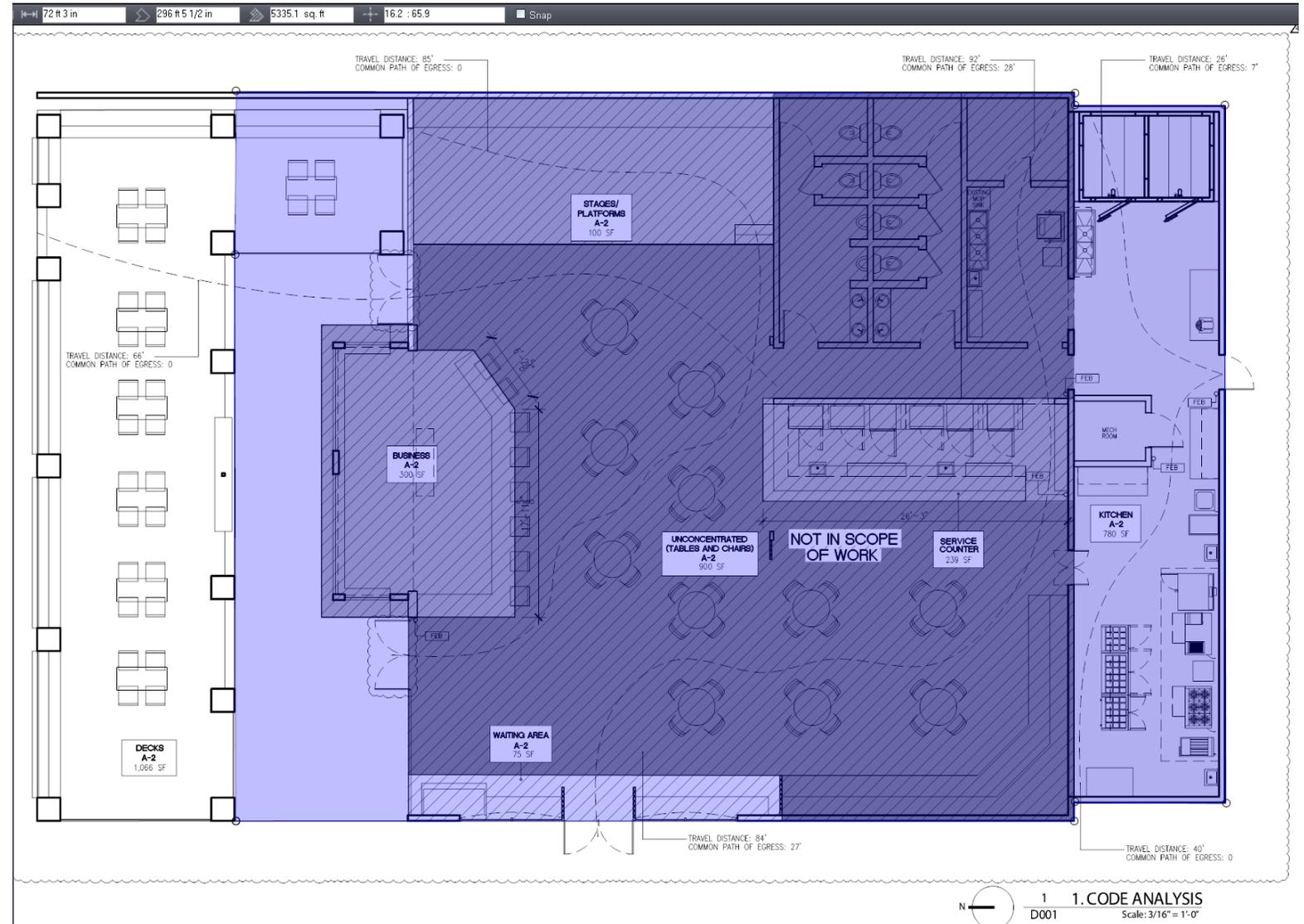
**OUTDOOR OCCUPANT LOAD : 87**  
**INDOOR OCCUPANT LOAD : 196**  
**TOTAL OCCUPANT LOAD : 283**

# A2 OCCUPANCY SQUARE FOOTAGE REQUIREMENTS FOR A SPRINKLER SYSTEM

The area highlighted in purple indicates the fire area.

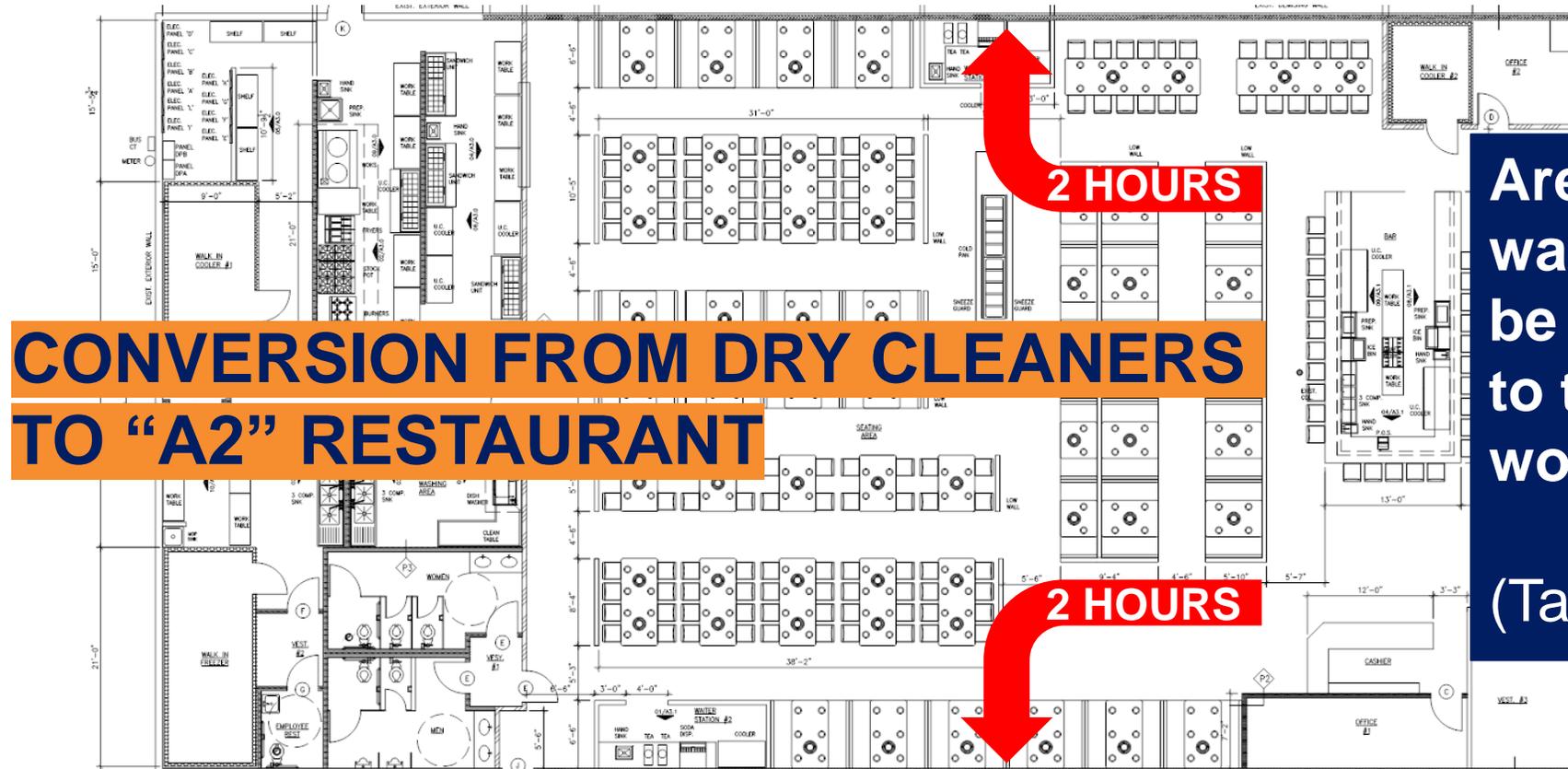
The overall highlighted area is 5,335 SQFT.

Per Section 903.2.1.2, what square footage can the fire area of an A2 occupancy be before a sprinkler is required?



# A2 OCCUPANCY REQUIREMENTS

ADJACENT TENANT | BARBER SHOP | "B" OCCUPANCY



CONVERSION FROM DRY CLEANERS TO "A2" RESTAURANT

Are the demising walls required to be updated due to the scope of work?  
(Table 508.4)

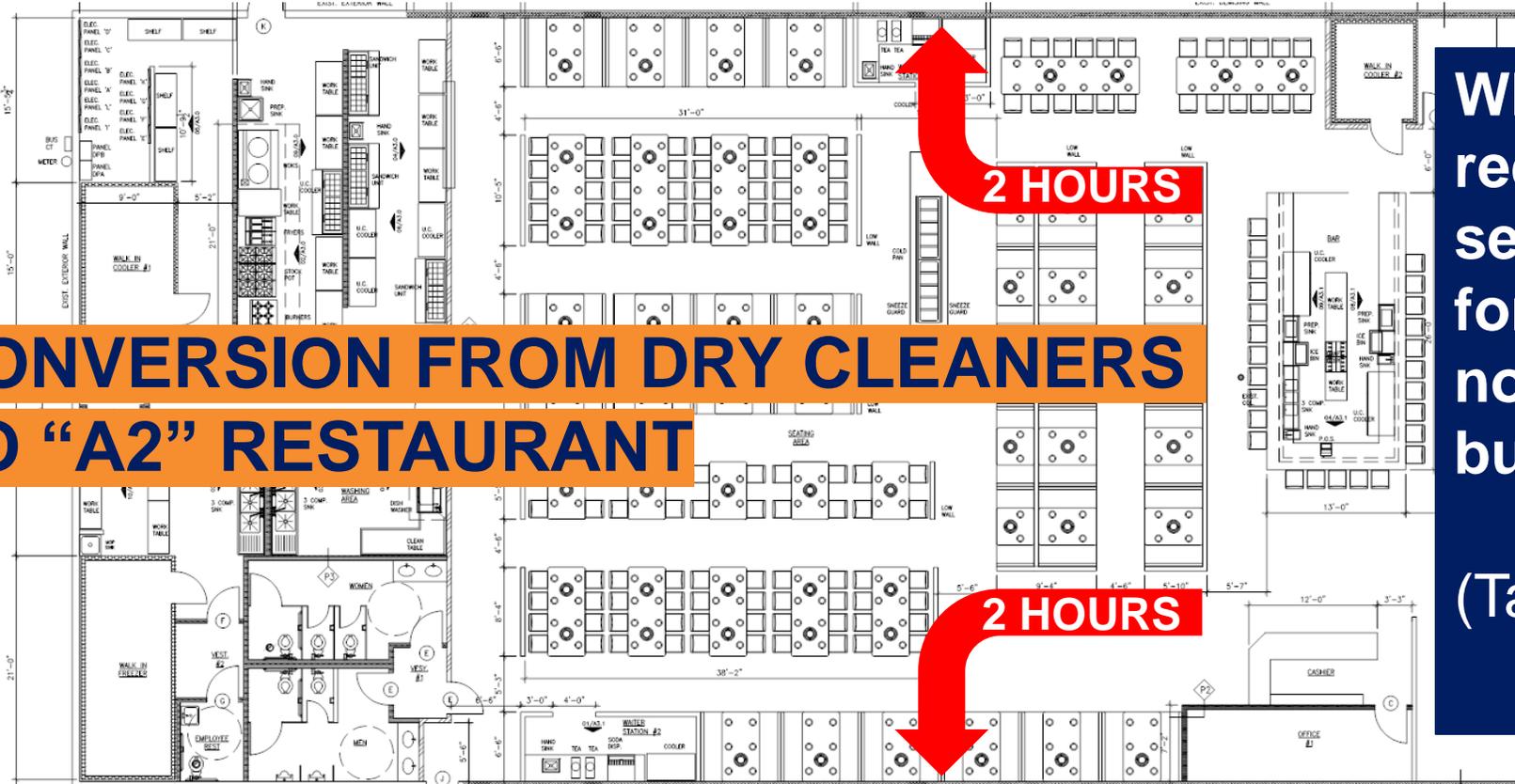
ADJACENT TENANT | RETAIL STORE | "M" OCCUPANCY

# A2 OCCUPANCY REQUIREMENTS

ADJACENT TENANT | BARBER SHOP | "B" OCCUPANCY

What are the required separation ratings for the walls in this non-sprinklered building?  
  
(Table 707.3.10)

CONVERSION FROM DRY CLEANERS TO "A2" RESTAURANT

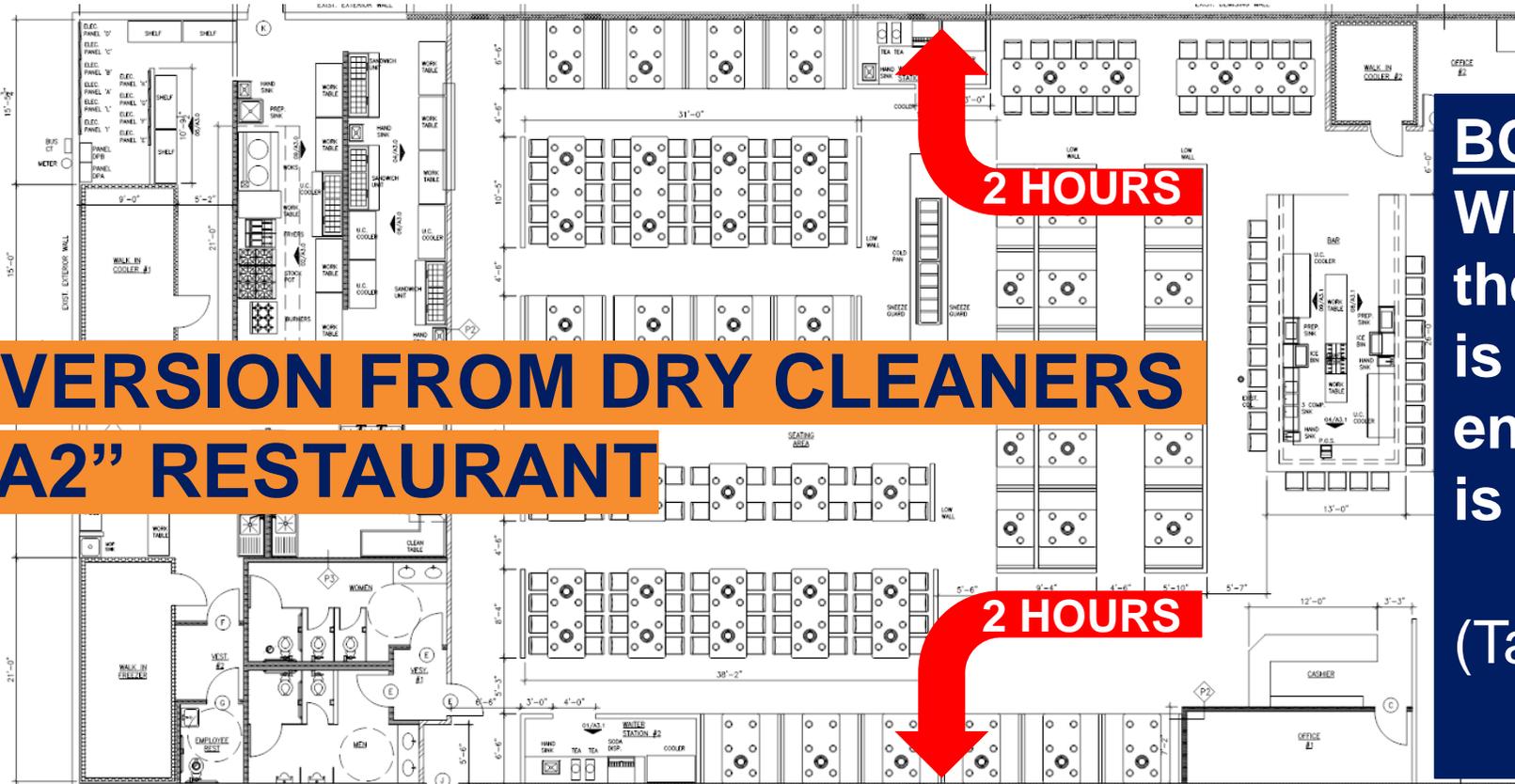


ADJACENT TENANT | RETAIL STORE | "M" OCCUPANCY

# A2 OCCUPANCY REQUIREMENTS

ADJACENT TENANT | BARBER SHOP | "B" OCCUPANCY

CONVERSION FROM DRY CLEANERS  
TO "A2" RESTAURANT



## BONUS QUESTION

What is required if the occupant load is 105 and the entire strip center is over 5,000 sq ft?

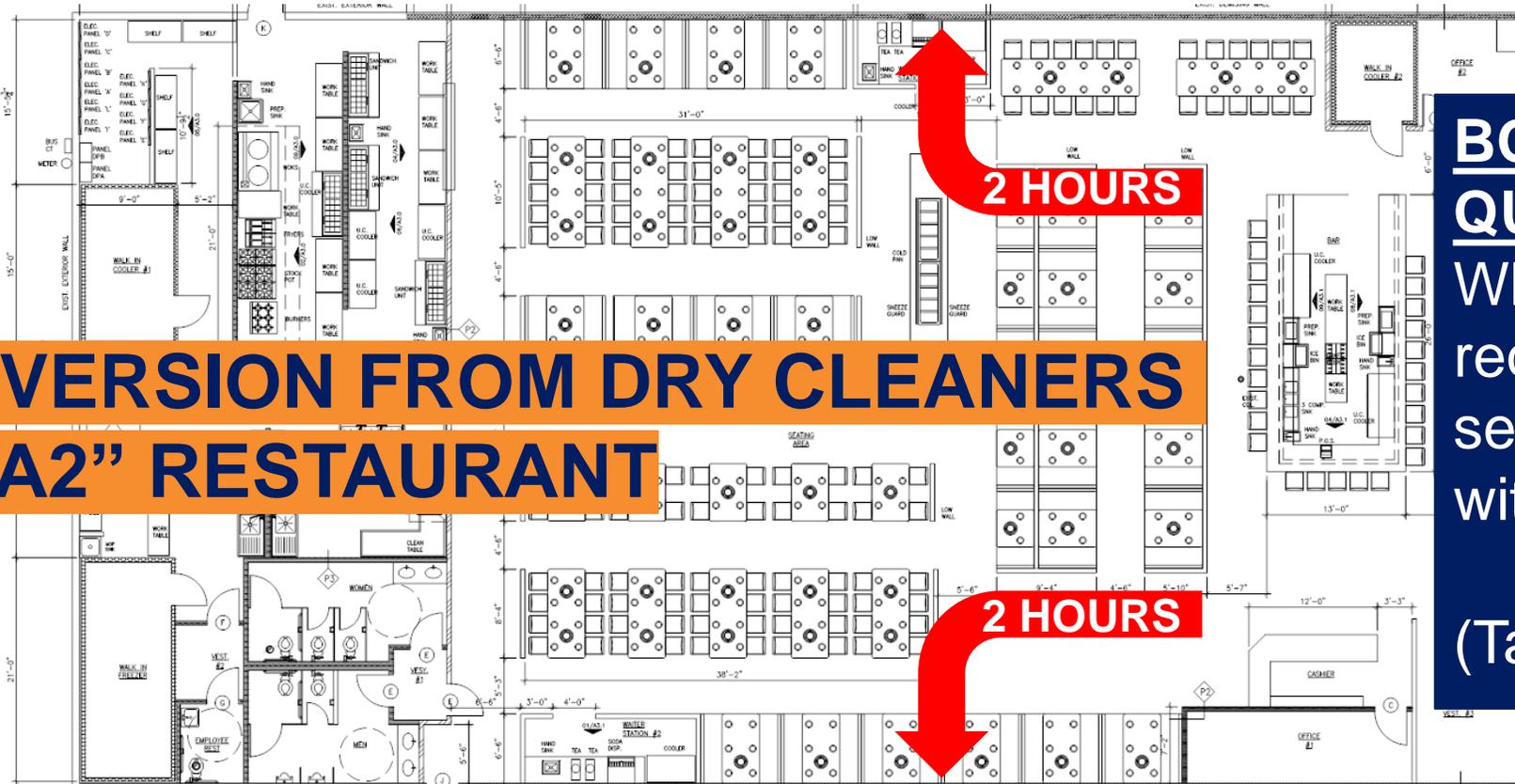
(Table 707.3.10)

ADJACENT TENANT | RETAIL STORE | "M" OCCUPANCY

# A2 OCCUPANCY REQUIREMENTS

ADJACENT TENANT | BARBER SHOP | "B" OCCUPANCY

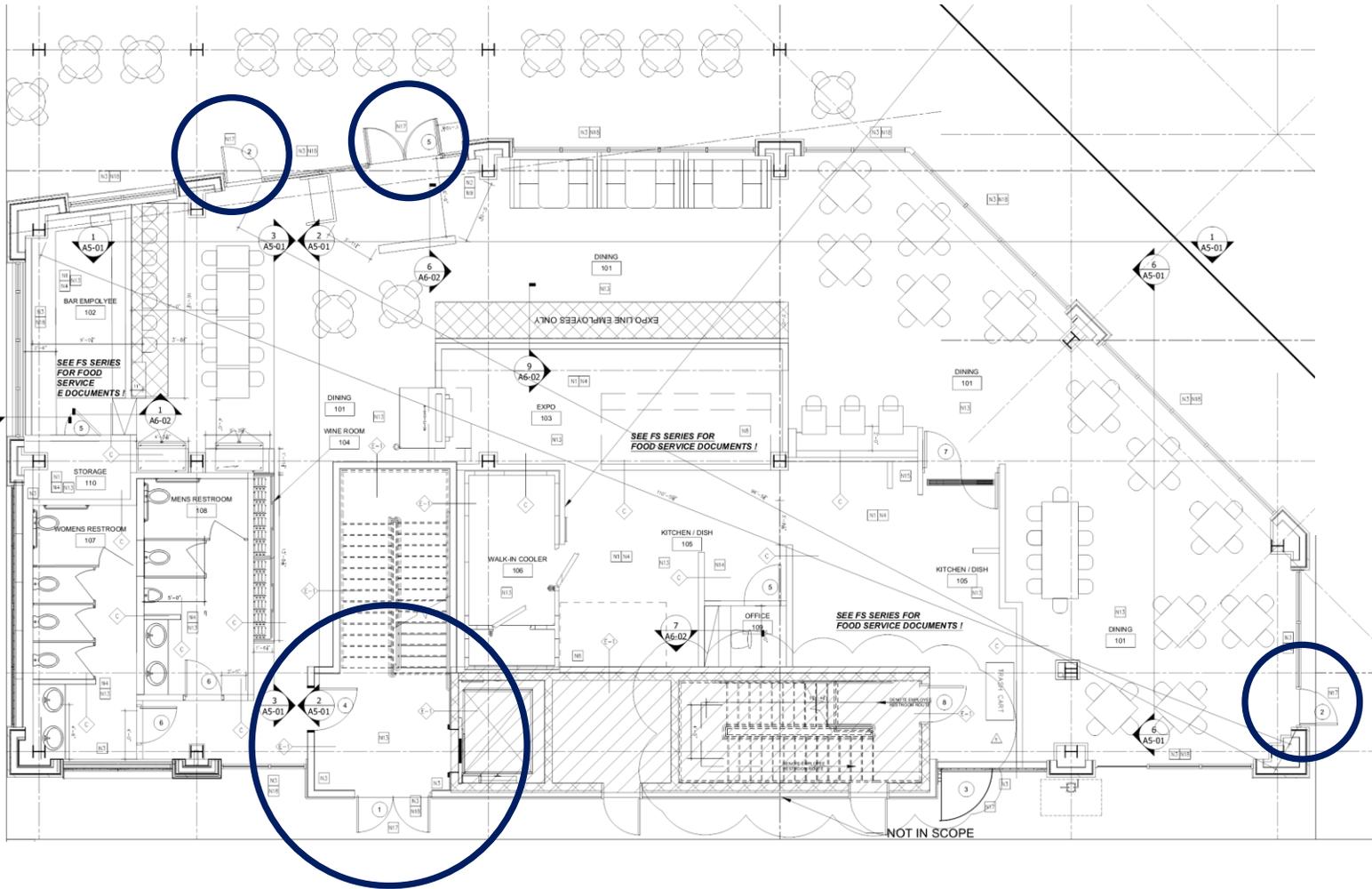
CONVERSION FROM DRY CLEANERS  
TO "A2" RESTAURANT



**BONUS QUESTION**  
What is the new required separation rating with a sprinkler?  
(Table 707.3.10)

ADJACENT TENANT | RETAIL STORE | "M" OCCUPANCY

# RESTAURANT EXITS

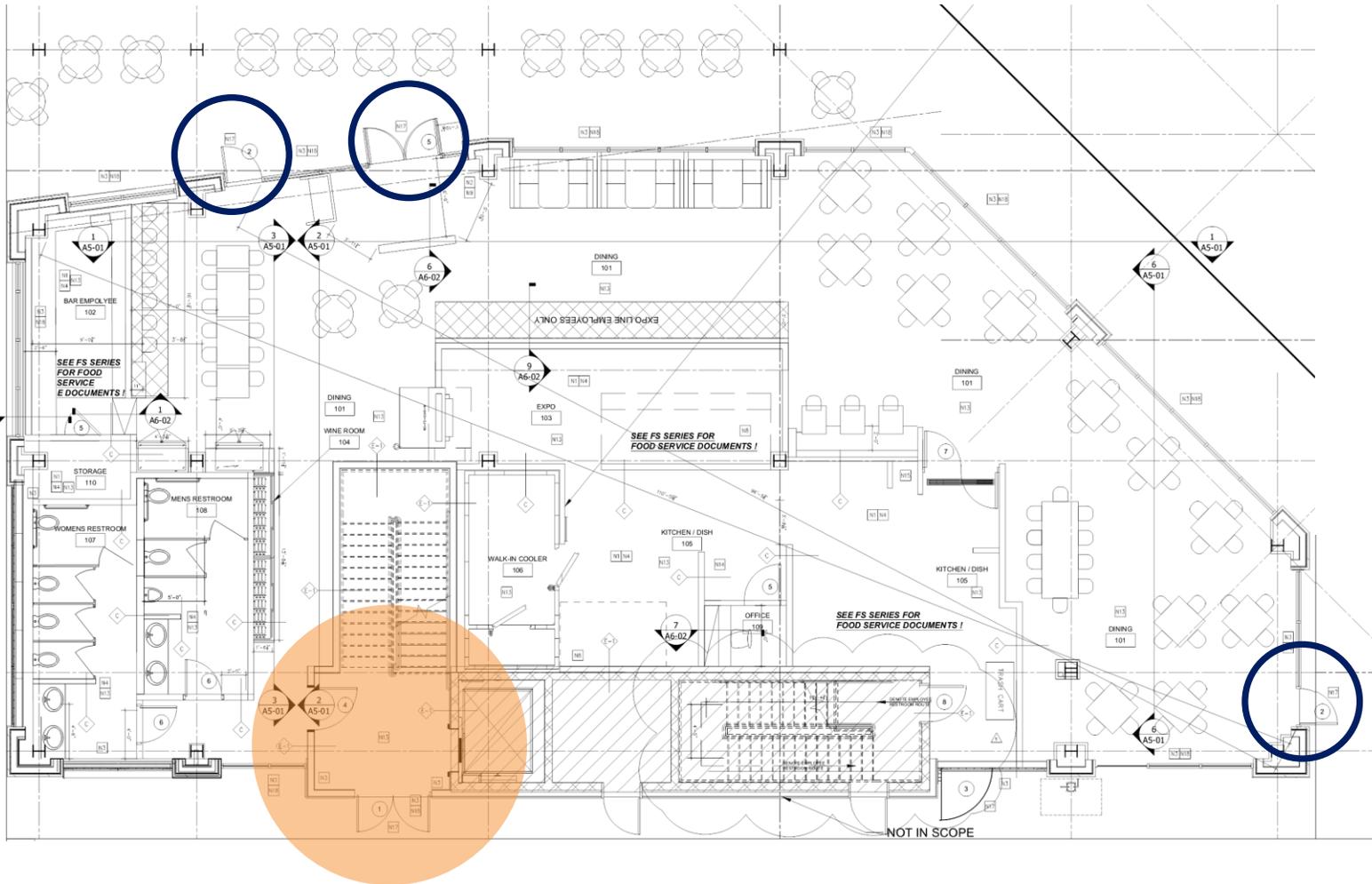


**How many exits are required from first floor with a 236-occupant load?**

**TABLE 1006.3.3 MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS PER STORY**

OCCUPANT LOAD PER STORY	MINIMUM NUMBER OF EXITS OR ACCESS TO EXITS FROM STORY
1-500	2
501-1,000	3
MORE THAN 1,000	4

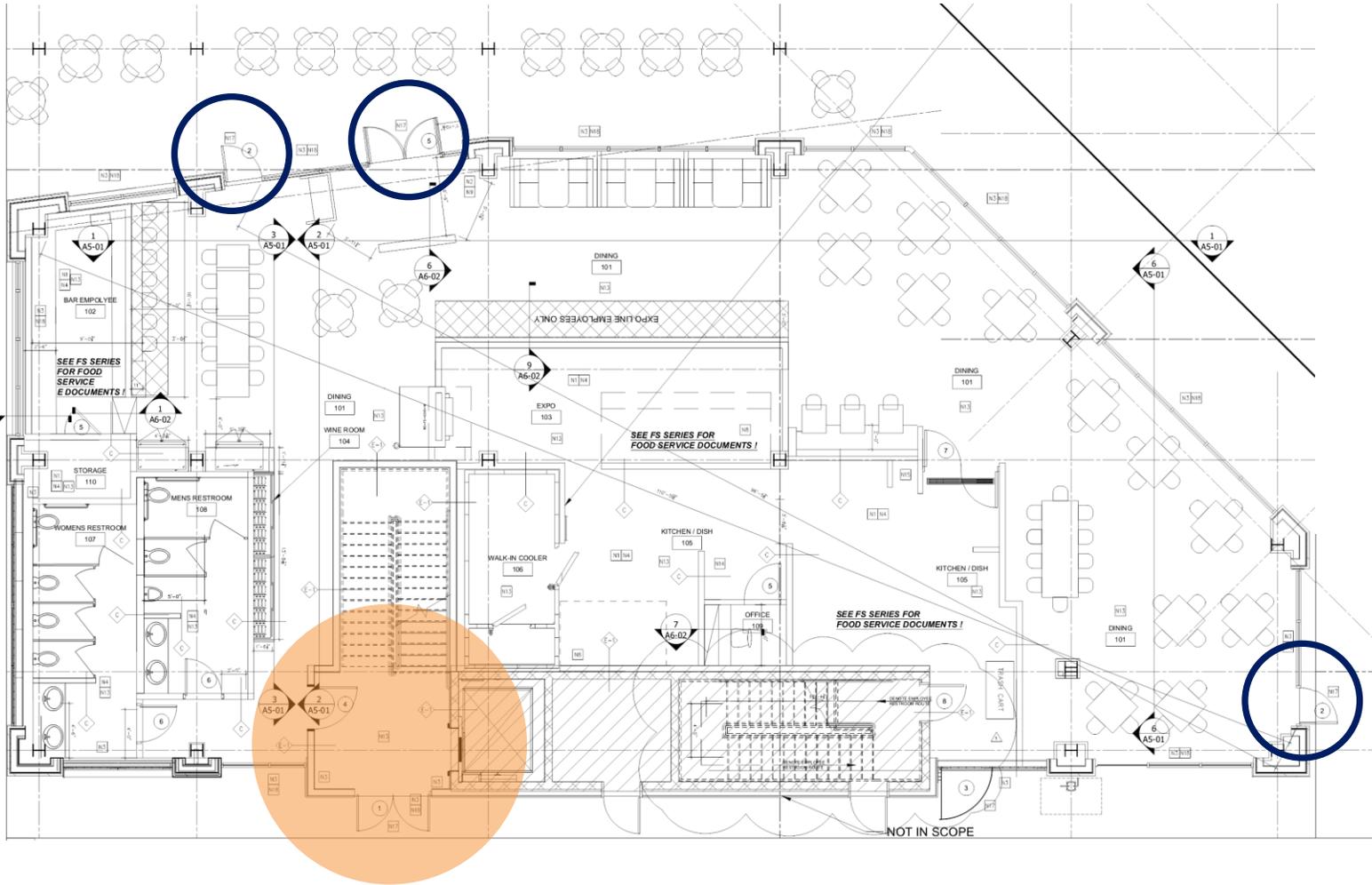
# STAIR SHAFT FIRE RATING



What is the required rating of the stair shaft in a two-story building?

Section 713.4 requires a 1 hour rated shaft enclosure for 3 stories and less.

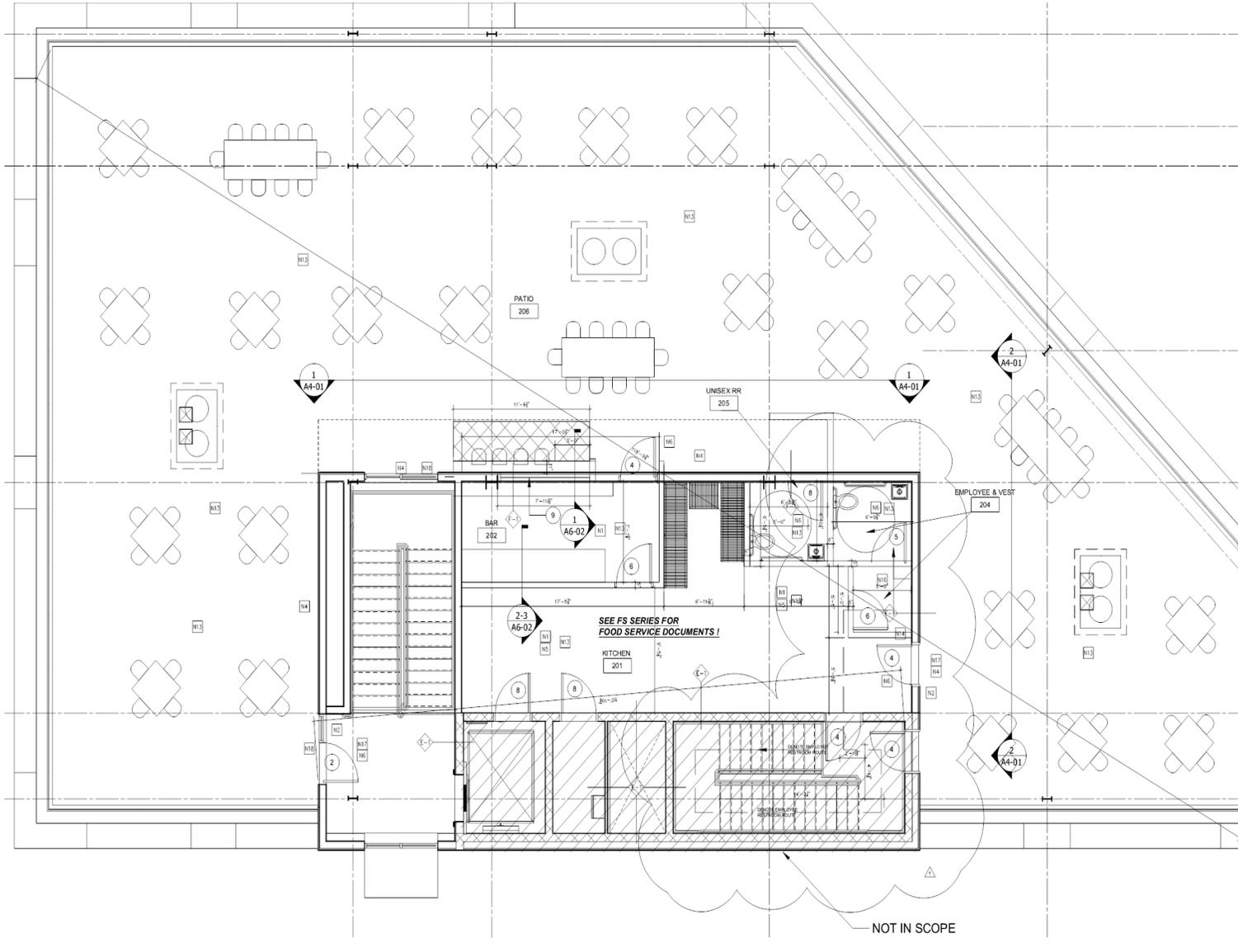
# ELEVATORS IN STAIR ENCLOSURES?



Can the elevator be located in the stair enclosure?

Section 1023.4, elevators shall not open into interior exit stairways and ramps.

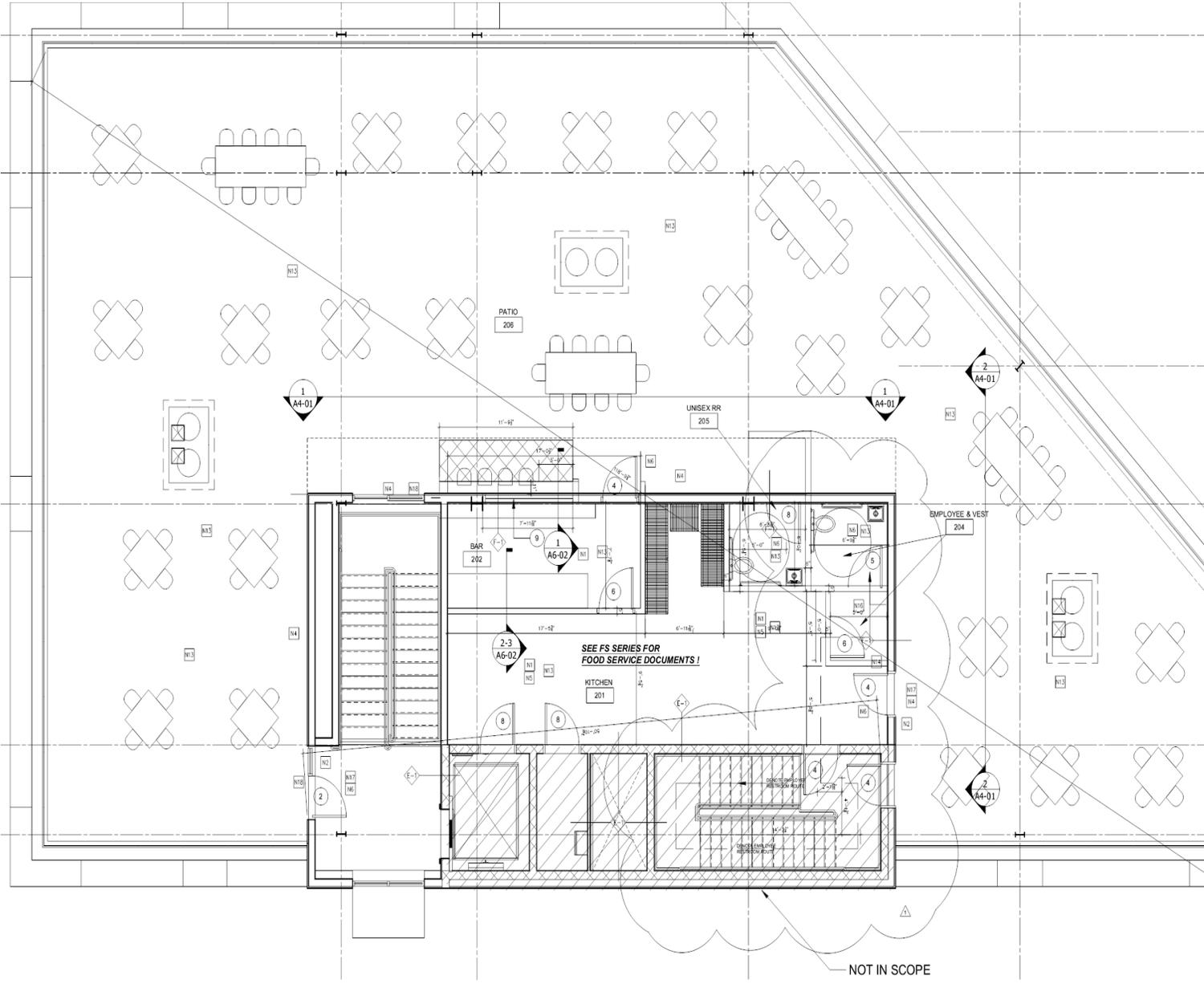
# RESTAURANT SPRINKLER REQUIREMENTS



Does a second story of restaurant require a sprinkler system?

**YES! Per Section 903.2.1.2, if the fire area is located on a floor other than the level of exit discharge, a sprinkler is required.**

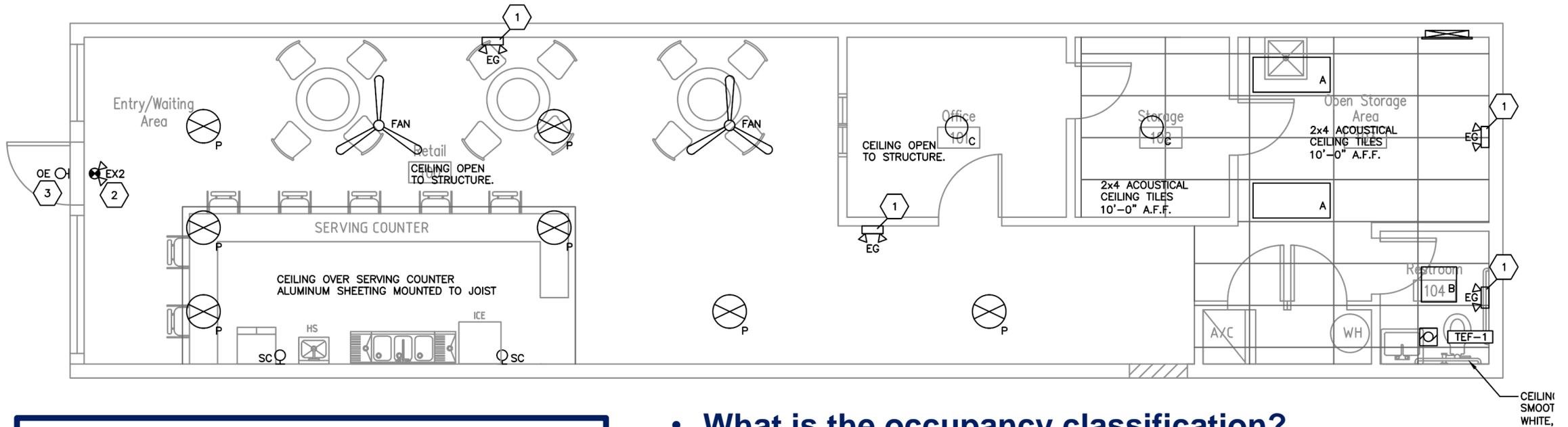
# RESTAURANT SPRINKLER REQUIREMENTS



If an office is located only on the second story of the restaurant, would it need to be sprinkled?

**YES!** The same principle in 903.2.1.2 applies. **HOWEVER**, they can propose a rated horizontal assembly following T707.3.10 to avoid the sprinkler for the office.

# RESTAURANT CLASSIFICATION



**NUTRITION BAR 1-1-2-?-B '12 IBC  
OVERALL : 600 SQFT  
OCCUPANT LOAD : 49 OCCUPANTS**

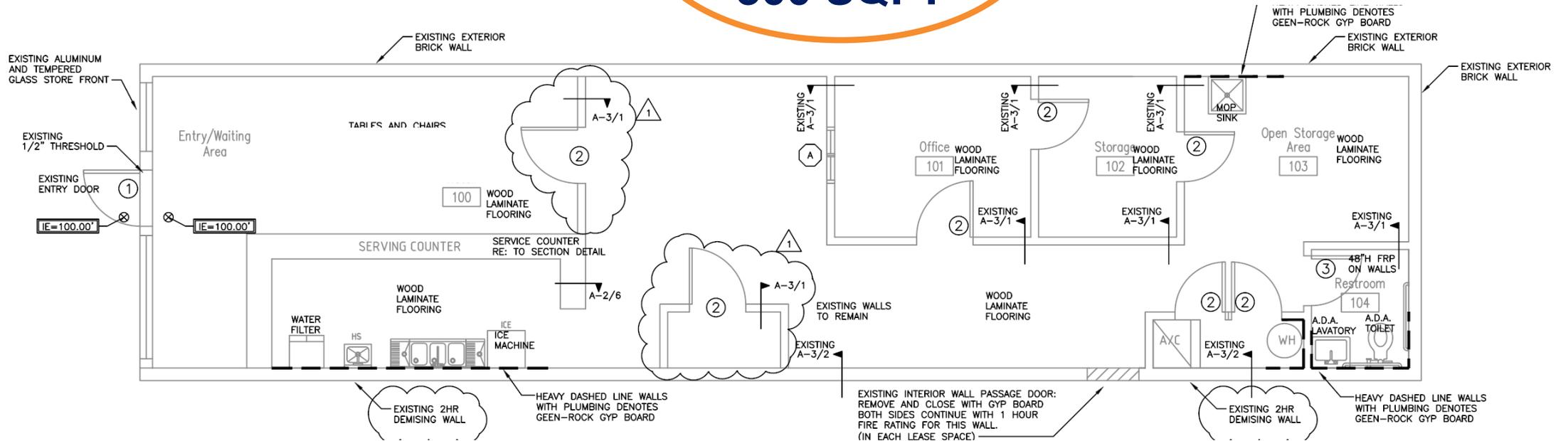
- What is the occupancy classification?
- Can this be considered take-out only?
- Do they need ARA for this use?
- Are they required to have exit signs?
- Do they need to remove the tables and chairs to still be considered a takeout?
- Can they include a canopy? If so, does it count towards their occupant load?
- Does the CO need to contain take-out only information? What about the job card?

# TAKE-OUT RESTAURANT

## Section 2902.3, Exception 2

OCCUPANCY TYPE **B**  
NO ALCOHOLIC BEVERAGES  
SERVED/SOLD ON PREMISES.

**TAKE-OUT  
ONLY  
300 SQFT**

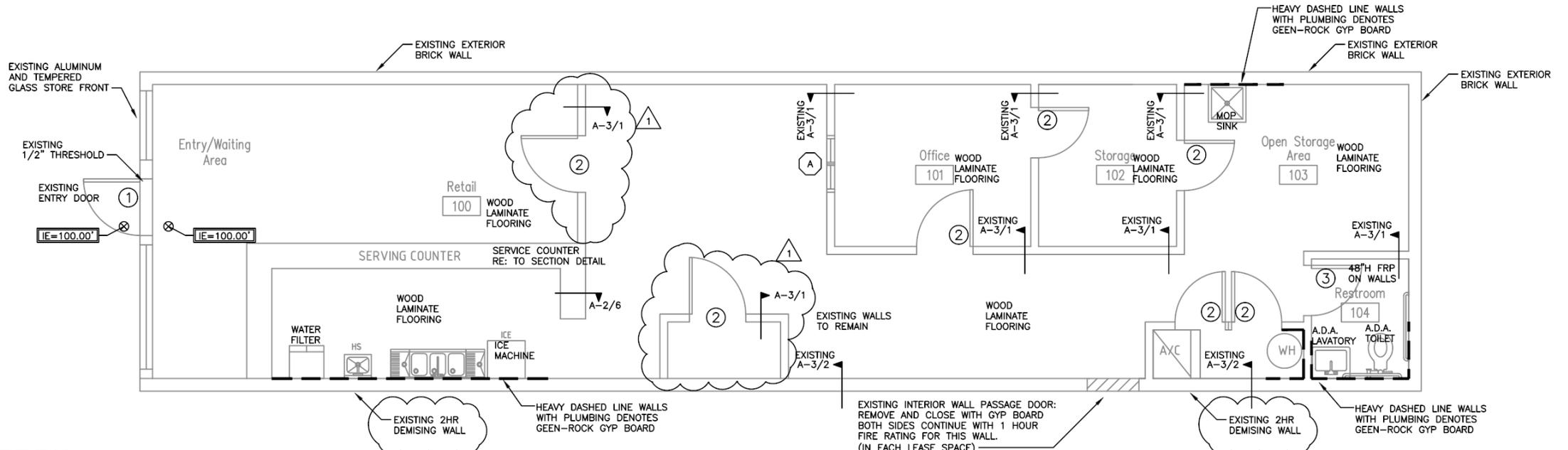


# TAKE-OUT RESTAURANT

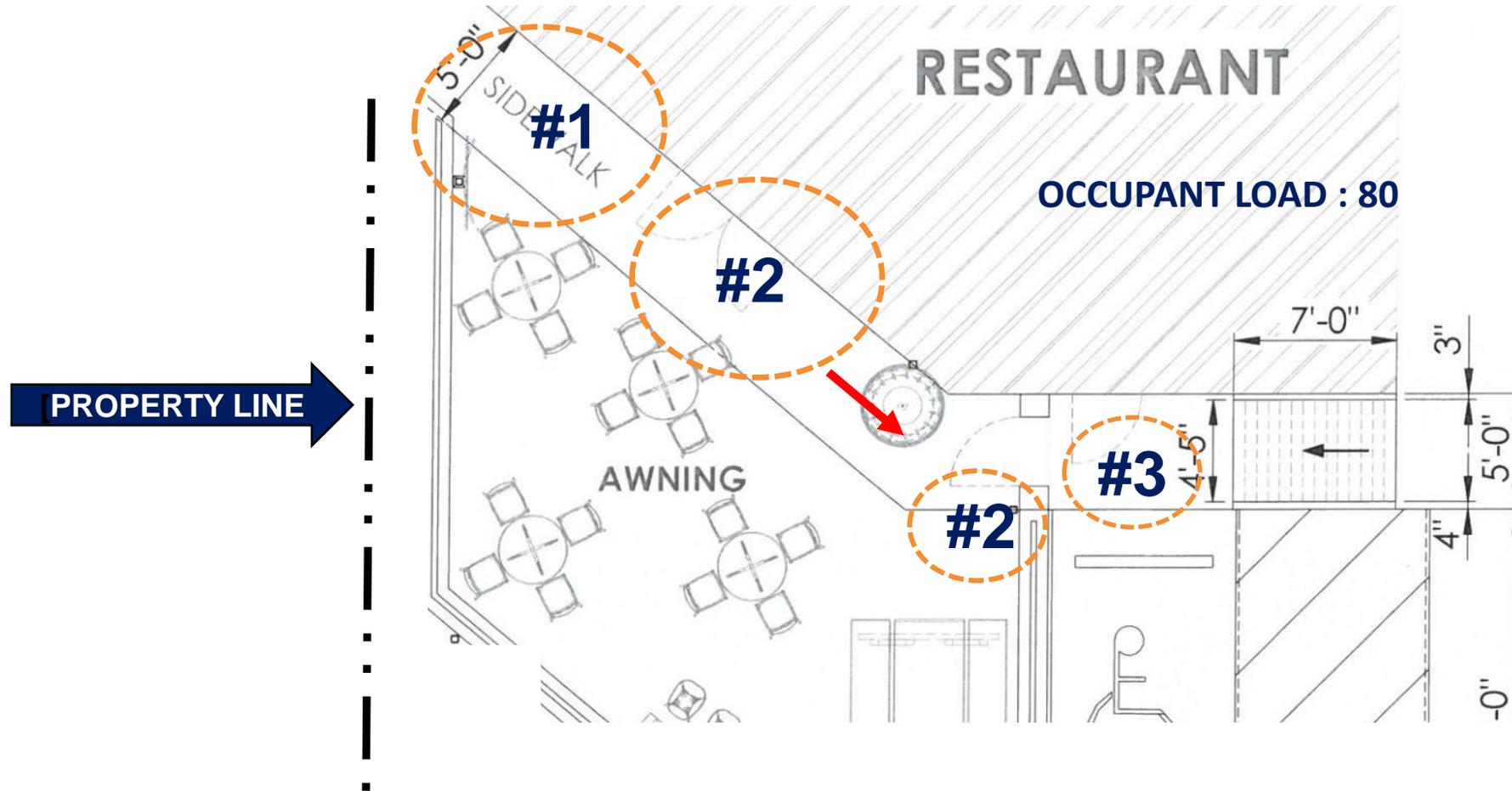
2902.3 Exception: Quick transactions (take-outs) Equal to 300 square feet  
2nd restroom not required

OCCUPANCY TYPE **D**.  
NO ALCOHOLIC BEVERAGES  
SERVED/SOLD ON PREMISES.

**TAKE-OUT  
ONLY  
300 SQFT**



# IDENTIFY THREE ISSUES WITH THIS PLAN

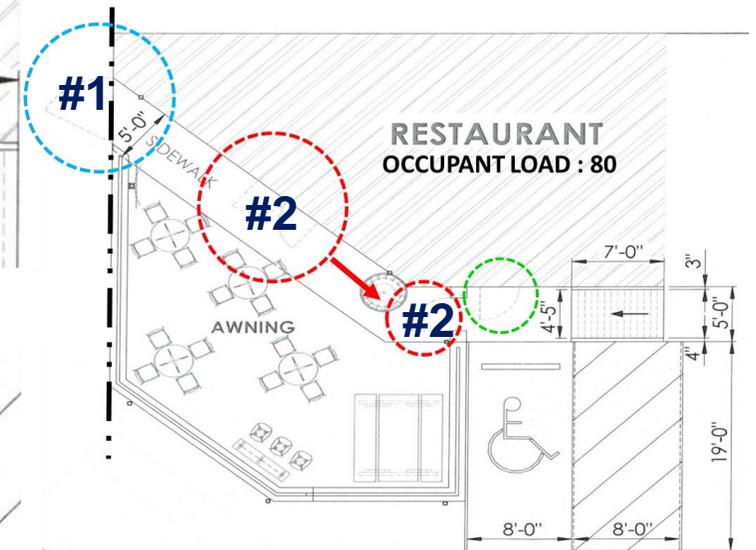
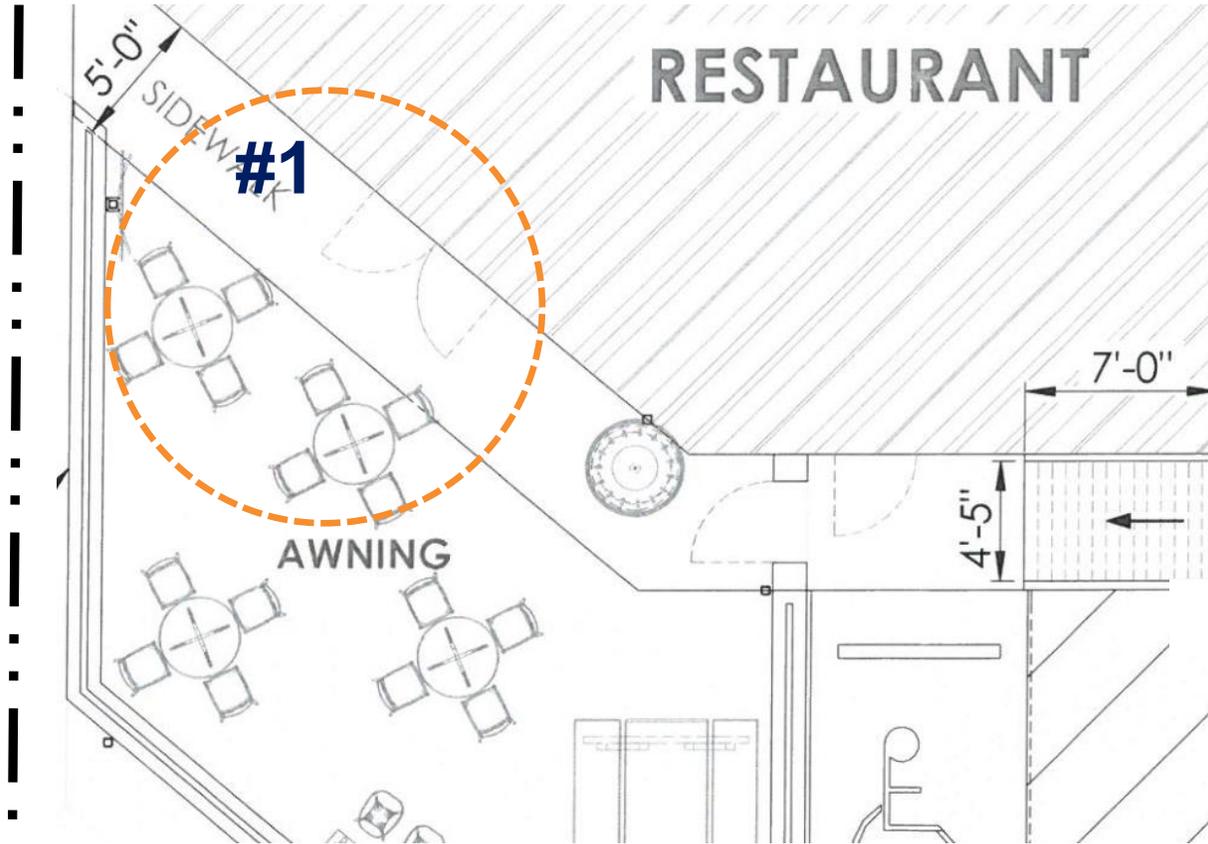


# IDENTIFY THREE ISSUES WITH THIS PLAN

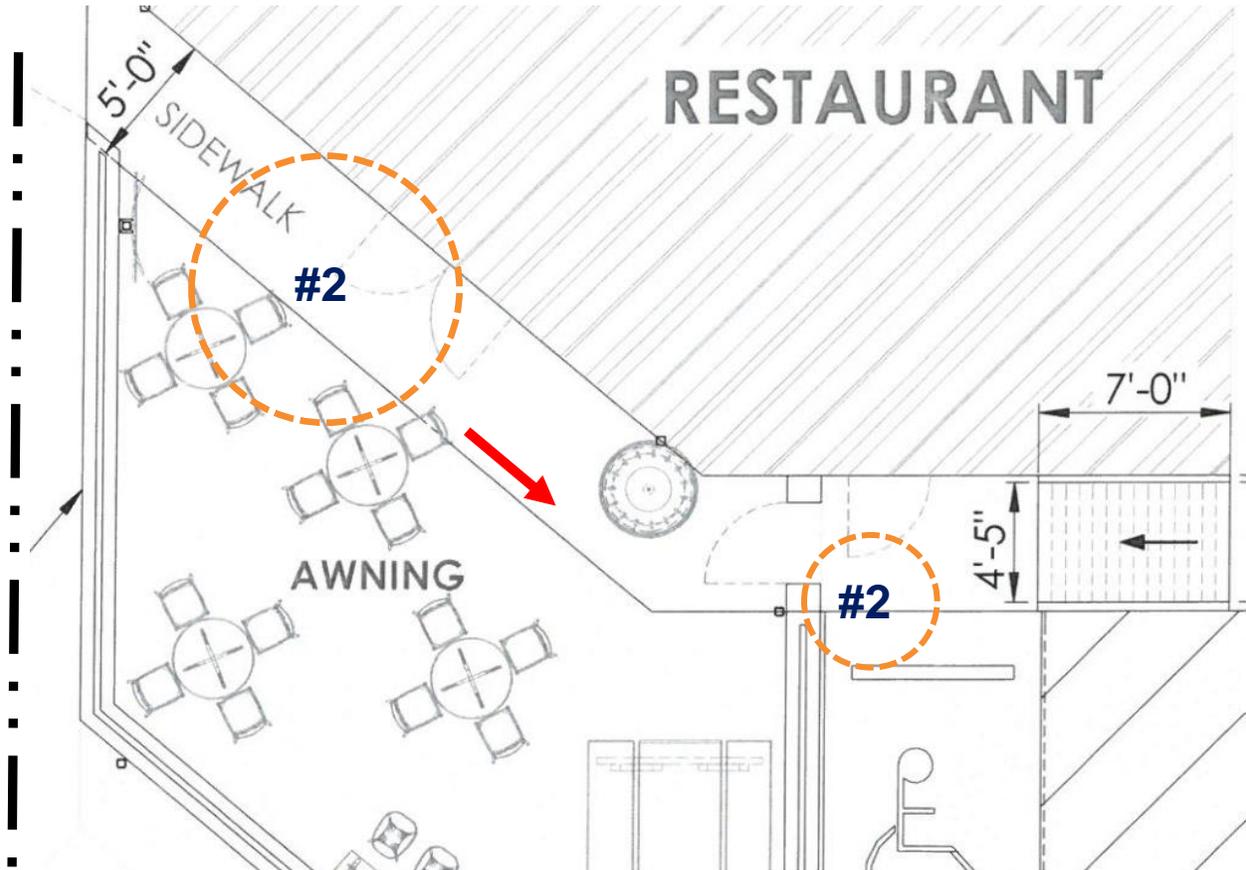
**OCCUPANT LOAD : 80**

1. THE DOOR OFF THE COVERED PATIO SWINGS OVER THE PROPERTY LINE

**PROPERTY LINE** →

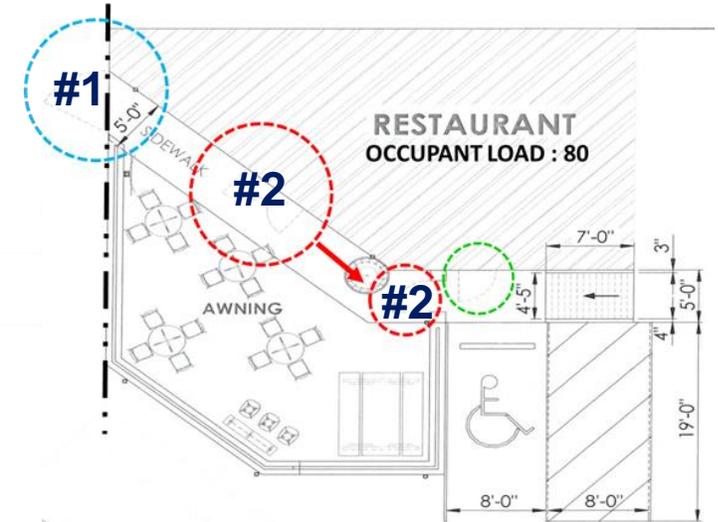


# IDENTIFY THREE ISSUES WITH THIS PLAN



## OCCUPANT LOAD : 80

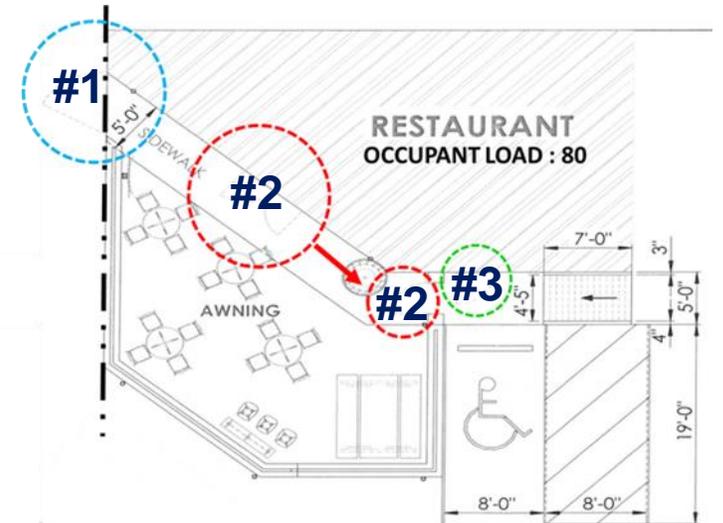
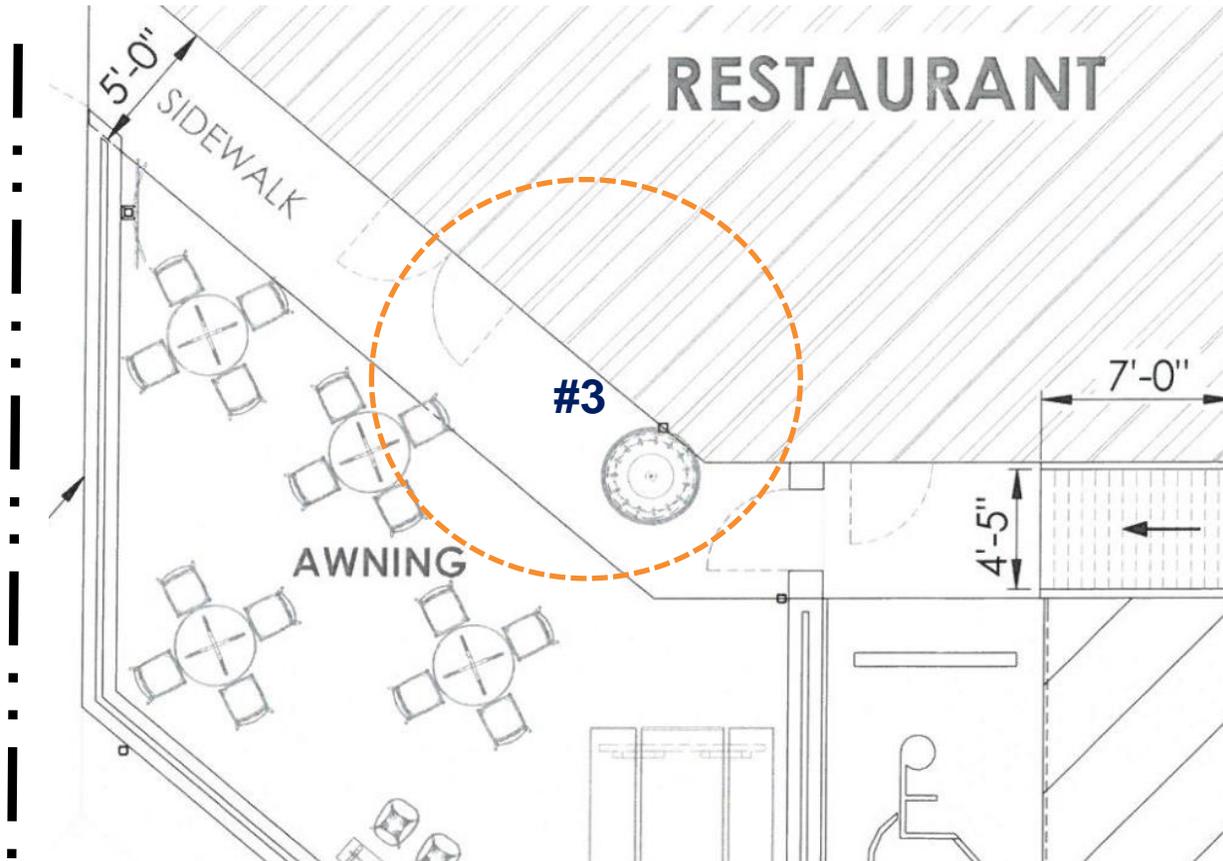
2. If double doors are a means of egress from building, the patio door does not swing in the correction direction.



# IDENTIFY THREE ISSUES WITH THIS PLAN

## OCCUPANT LOAD : 80

3. The door exiting the building blocks the exit from the patio. The patio door is a required exit from building and patio and cannot be blocked.



PROPERTY LINE

# OCCUPANT LOAD – COVERED CANOPY



The occupant load under this outdoor structure is 40. The occupant load inside the restaurant is 65. The total square footage of both is 4,500 sq ft.

Is a sprinkler required?

A sprinkler is required for the covered canopy. The occupant load is over 100 and requires that both the interior and exterior require a sprinkler system. Since the canopy is covered, it is all considered a single fire area.

# OCCUPANT LOAD – COVERED CANOPY



The occupant load under this outdoor structure is 40. The occupant load inside the restaurant is 65. The overall square footage of both is 4,500 sq ft.

Is a sprinkler required?

A sprinkler is not required for this open-air trellis. The roof is not fully covered, it is not considered part of the fire area to be sprinkled.

# RESTAURANT FIRE AREA

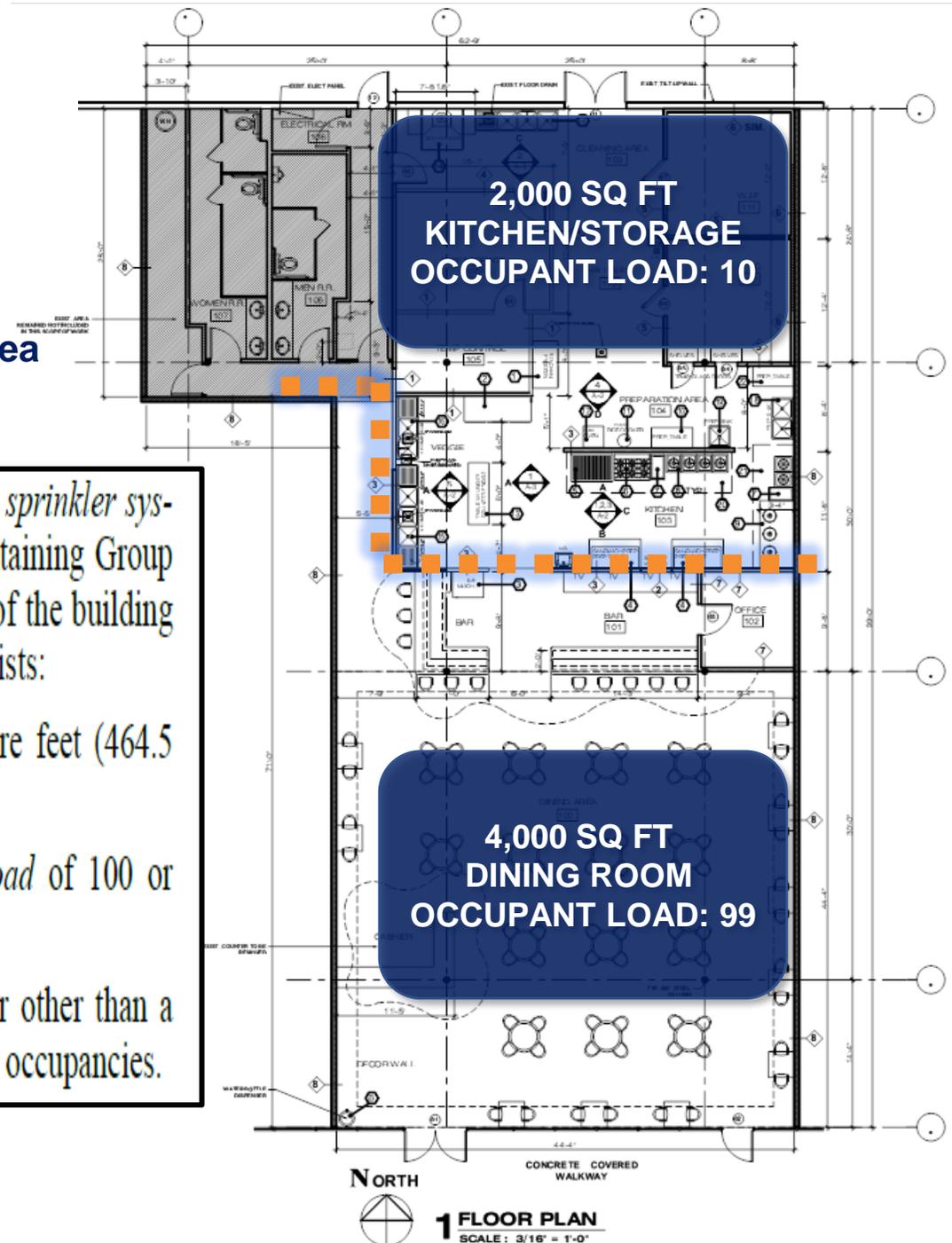
The occupant load of the overall proposed 6,000 SQ FT restaurant has an occupant load of 120. The designer proposes a fire barrier shown in orange to create a new fire area.

- *Is a sprinkler system required?*
- *What can the designer propose to avoid sprinklers?*

area has been decreased to meet requirements, the occupant load for the fire area does comply per 903.2.1.2.

[F] 903.2.1.2 Group A-2. An automatic sprinkler system shall be provided for fire areas containing Group A-2 occupancies and intervening floors of the building where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (464.5 m<sup>2</sup>).
2. The fire area has an occupant load of 100 or more.
3. The fire area is located on a floor other than a level of exit discharge serving such occupancies.



# RESTAURANT FIRE AREA

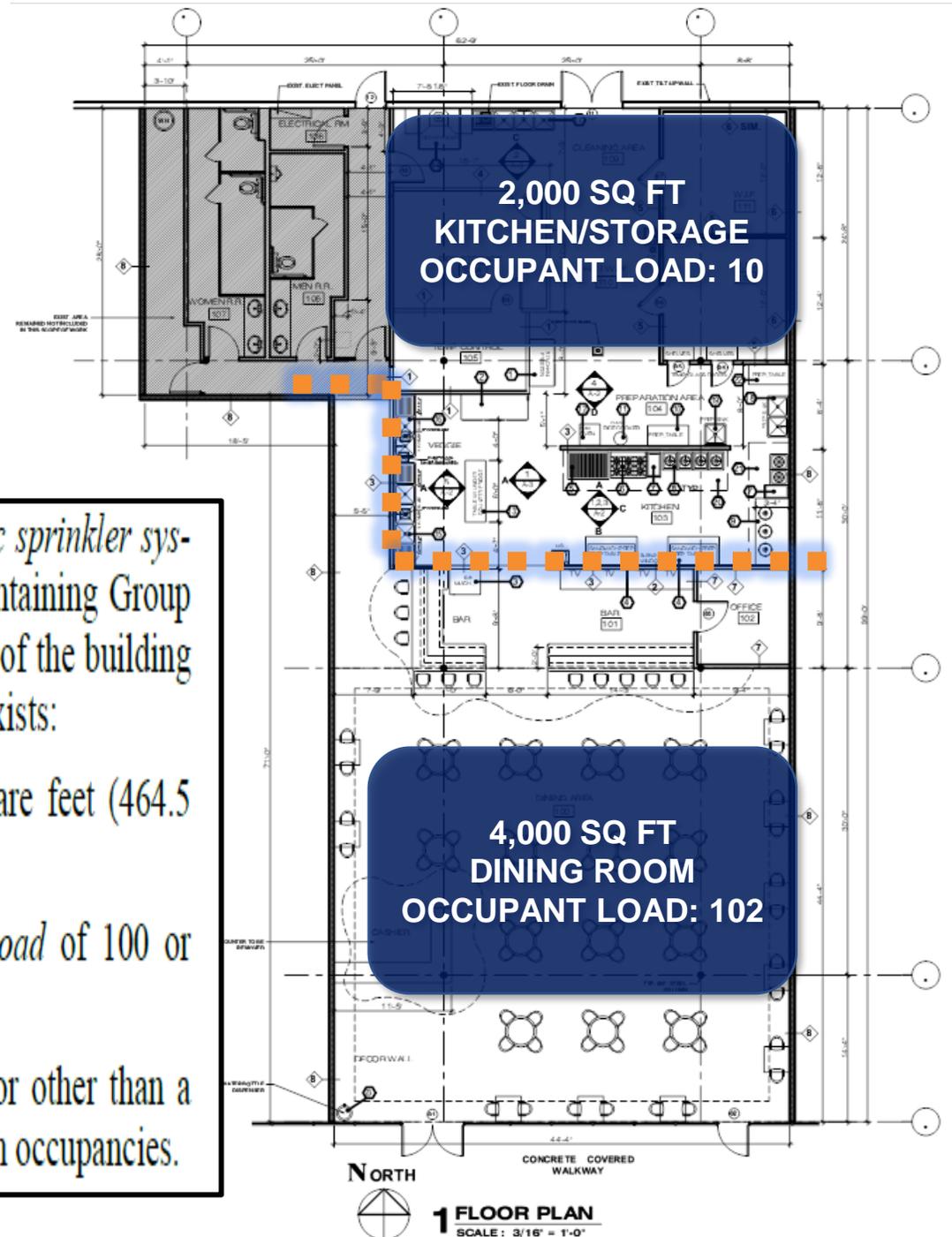
The occupant load of the overall proposed 6,000 SQ FT restaurant has an occupant load of 120. The designer proposes a fire barrier shown in orange to create a new fire area.

- *Is a sprinkler system required?*
- *What can the designer propose to avoid sprinklers?*

YES. Although the overall fire area has been decreased to meet requirements, the occupant load for the fire area does not comply per 903.2.1.2.

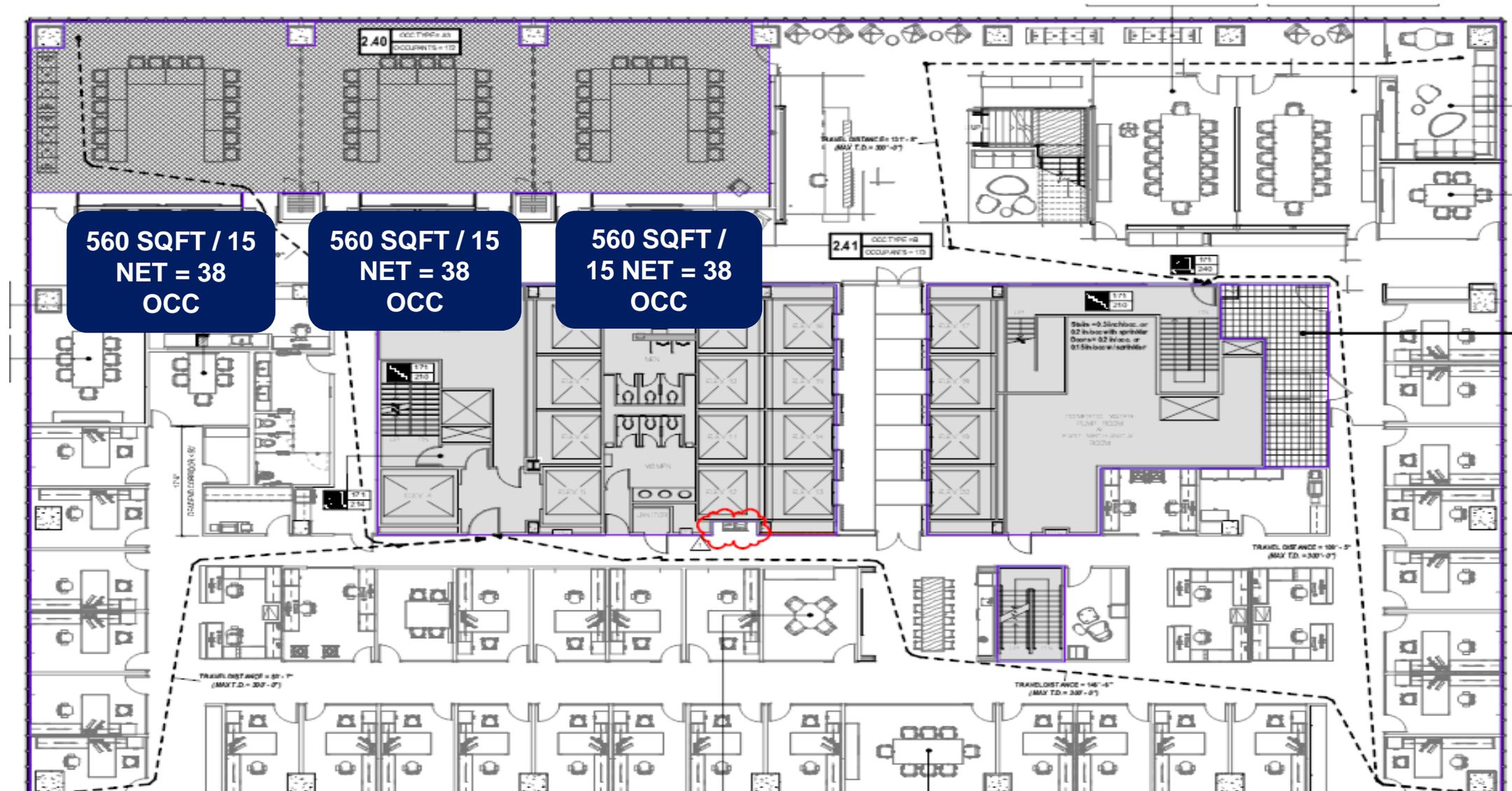
[F] 903.2.1.2 Group A-2. An automatic sprinkler system shall be provided for fire areas containing Group A-2 occupancies and intervening floors of the building where one of the following conditions exists:

1. The fire area exceeds 5,000 square feet (464.5 m<sup>2</sup>).
2. The fire area has an occupant load of 100 or more.
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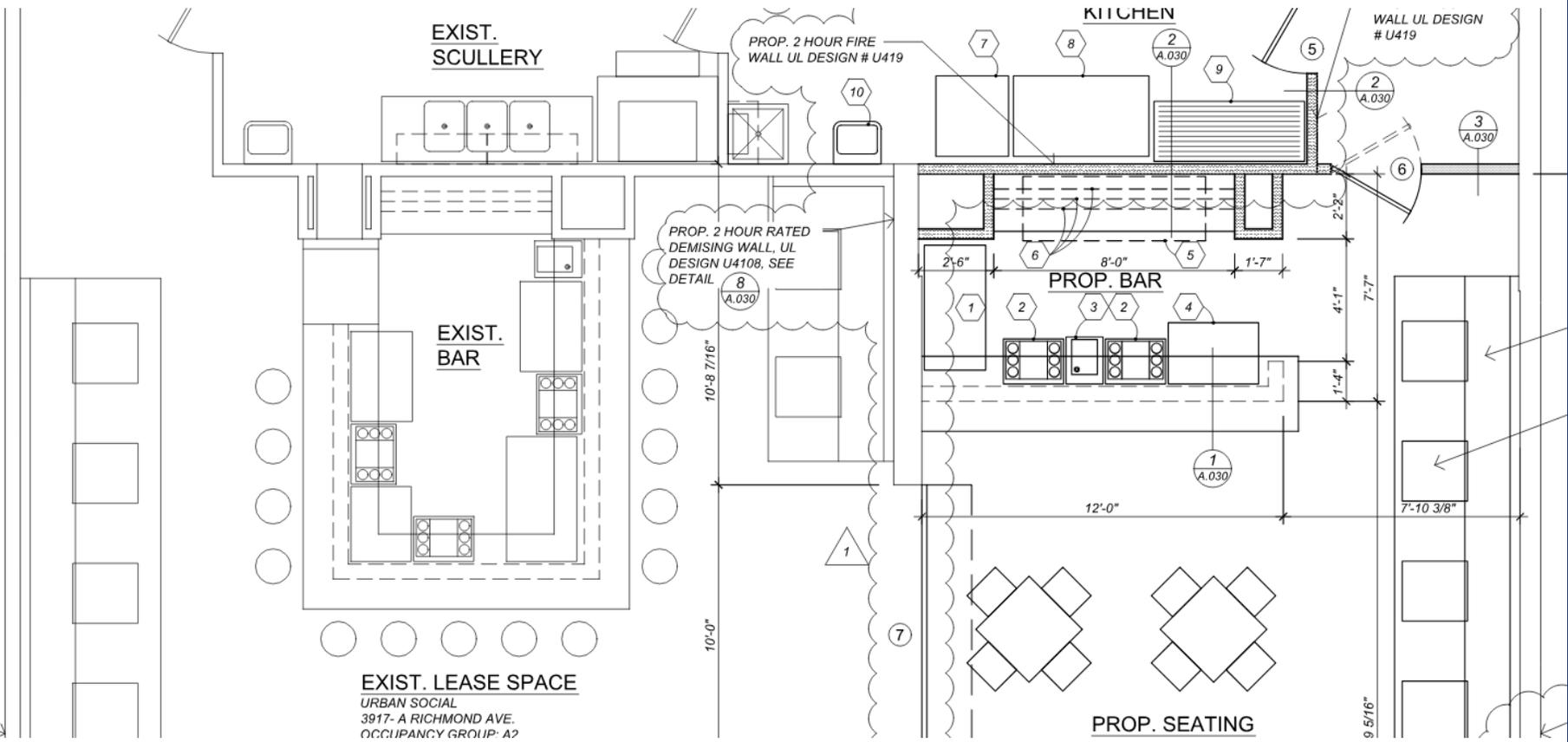


# MISCELLANEOUS ASSEMBLIES

# CONFERENCE ROOM AND EXITS



# SINGLE STANDING APARTMENT CLUBHOUSE



Assembly with an occupant load with 49 or less is classified as a B occupancy.

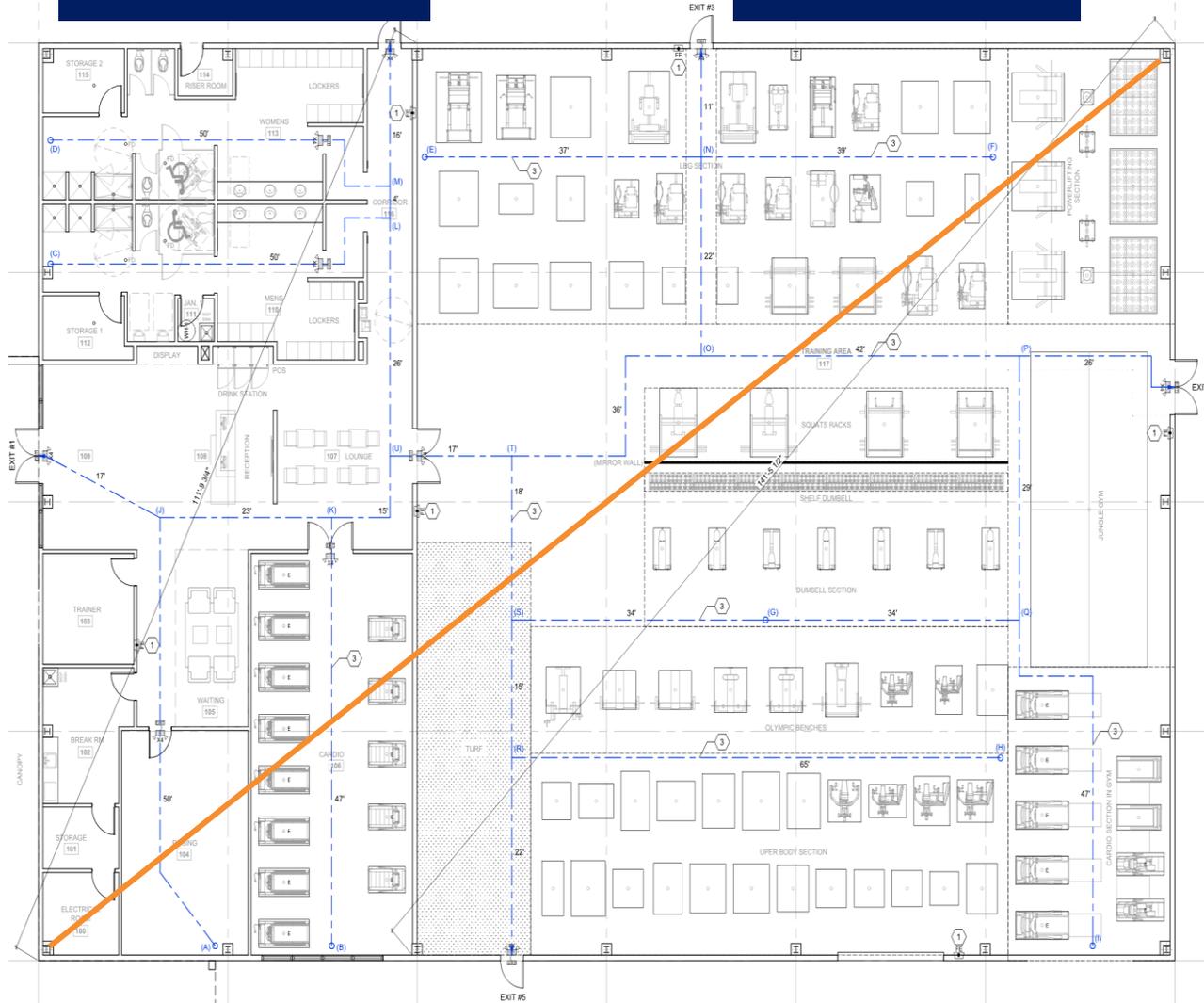
Occupant load 50 or more is classified as an A3 occupancy.

Section 303.1.1

# FITNESS EXITS

1000 SQFT / 50 NET  
= 20 OCC

3000 SQFT /  
50 NET = 60 OCC

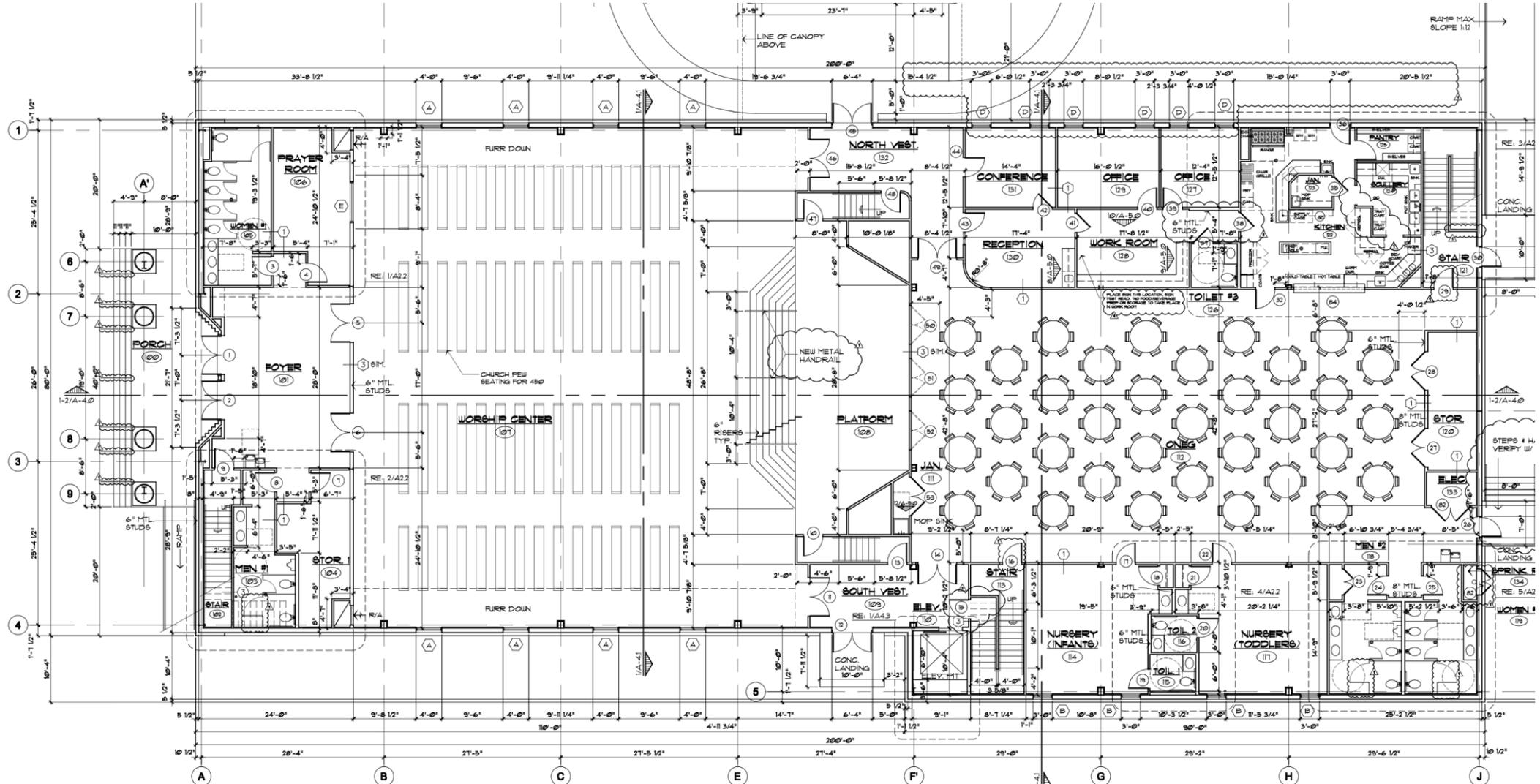


In a Fitness Center, exits would need to be half diagonal distance in non-sprinklered building  
1007.1.1  
2021IBC

# **CHURCHES**

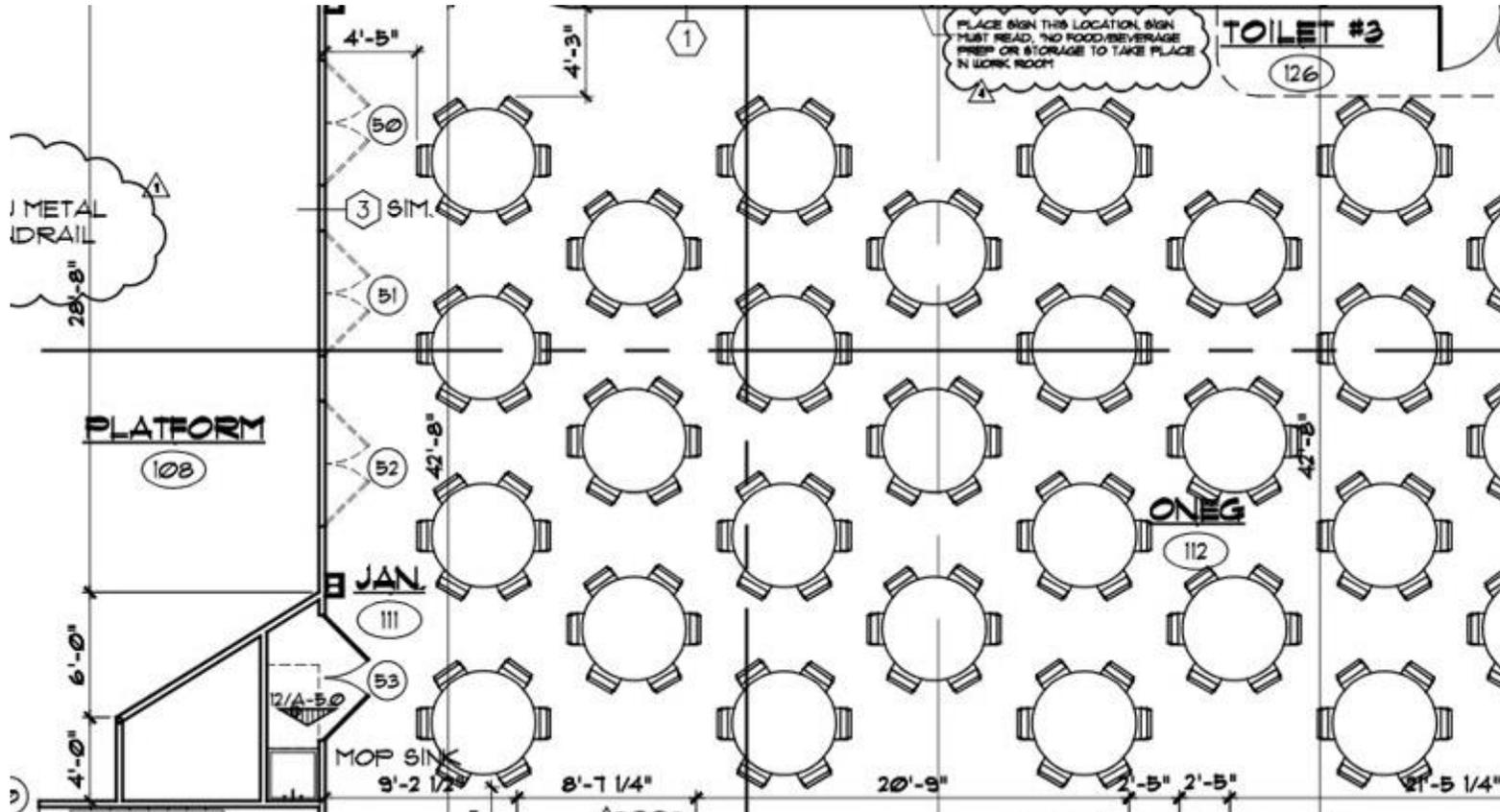
- OCCUPANT LOADS**
- SPRINKLERS**
- EXITING**

# HOW TO CALCULATE OCCUPANT LOAD FOR CHURCH





# HOW TO CALCULATE OCCUPANT LOAD FOR CHURCH



The occupant load factor includes the circulation in the calculation.

The fellowship hall is 1 person per 15 sq ft.

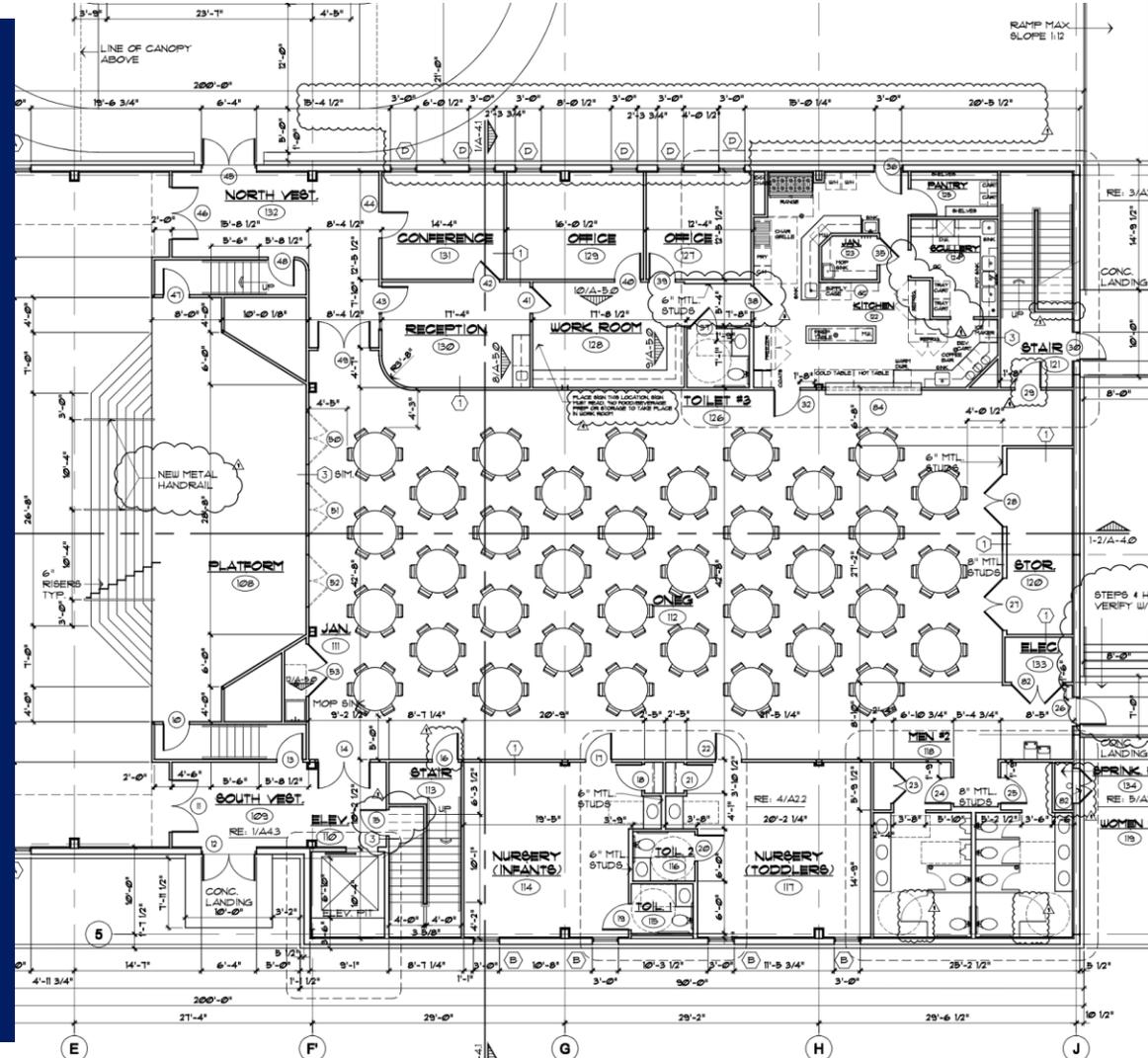
Table 1004.5

# HOW TO CALCULATE OCCUPANT LOAD FOR CHURCH

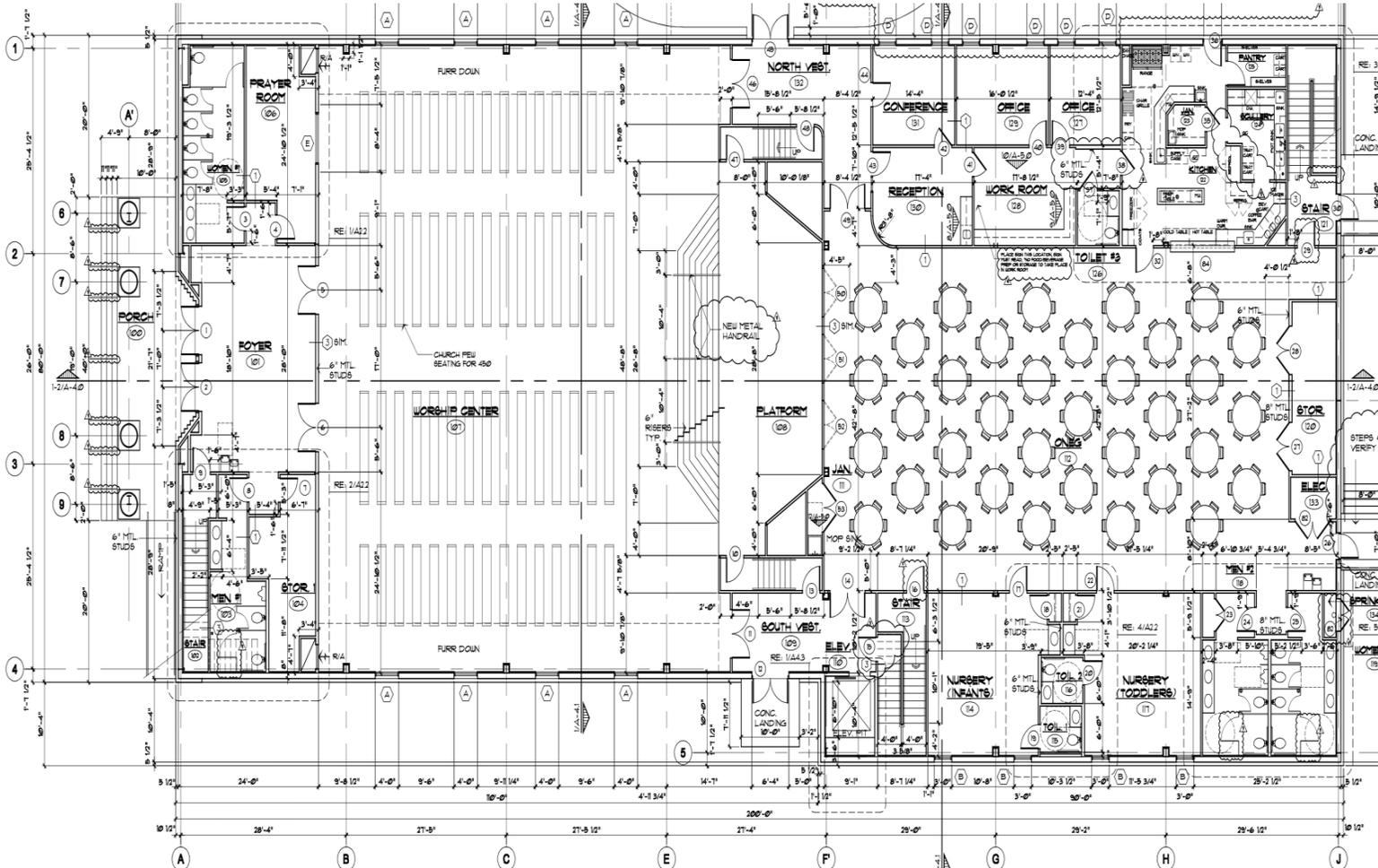
The conference room is  
1 person per 15 sq ft.

The kitchen is  
1 person per  
200 sq ft.

Table 1004.5



# SPRINKLER REQUIREMENTS



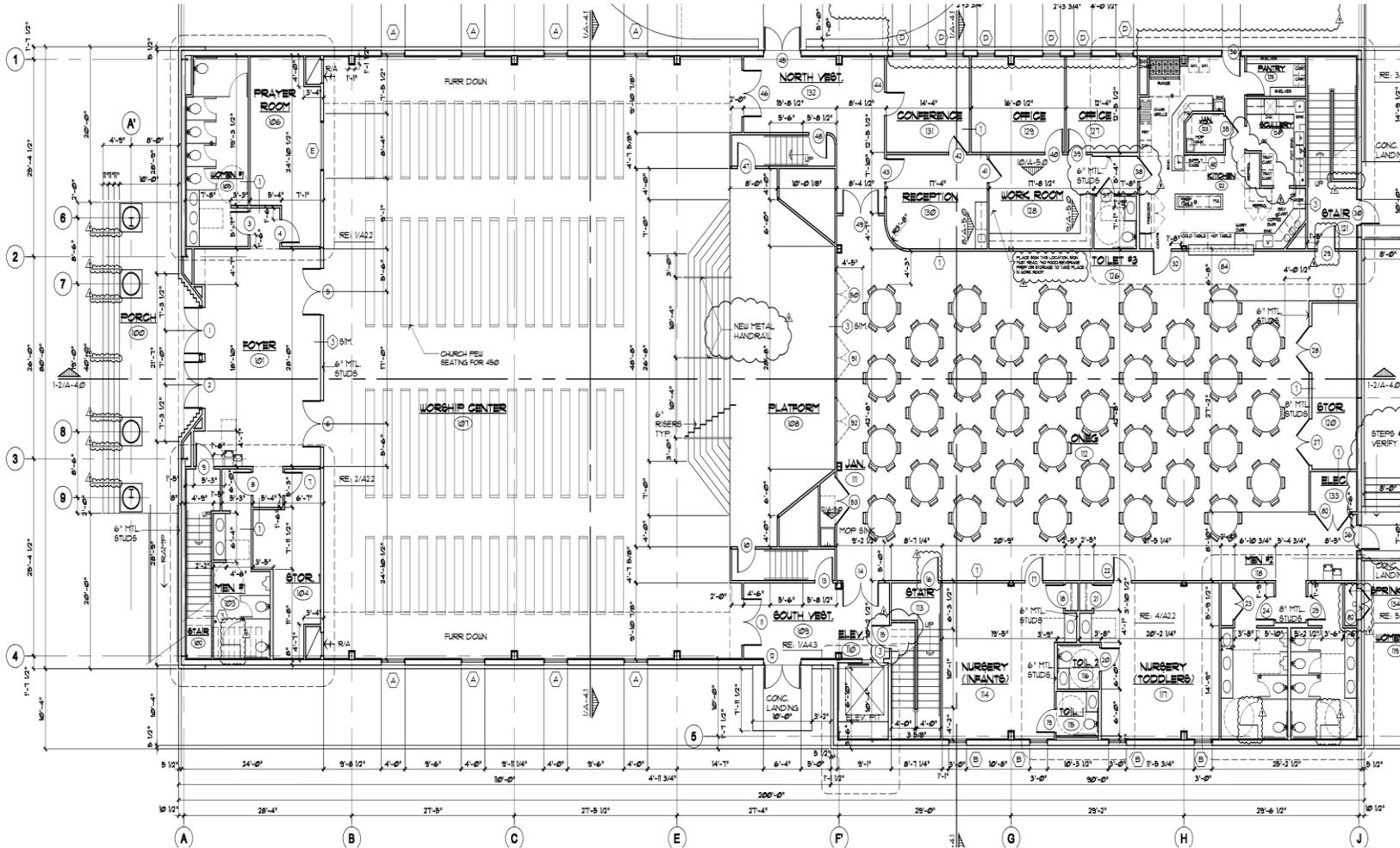
If the sanctuary has an occupant load of 280 and a total of 11,999 square feet. Are sprinklers required?

If the dining room has an occupant load of 250, would it require sprinklers?

300 occupant load would require sprinklers and/or 12,000 sq ft.

Section 903.2.1.3

# SPRINKLER REQUIREMENTS

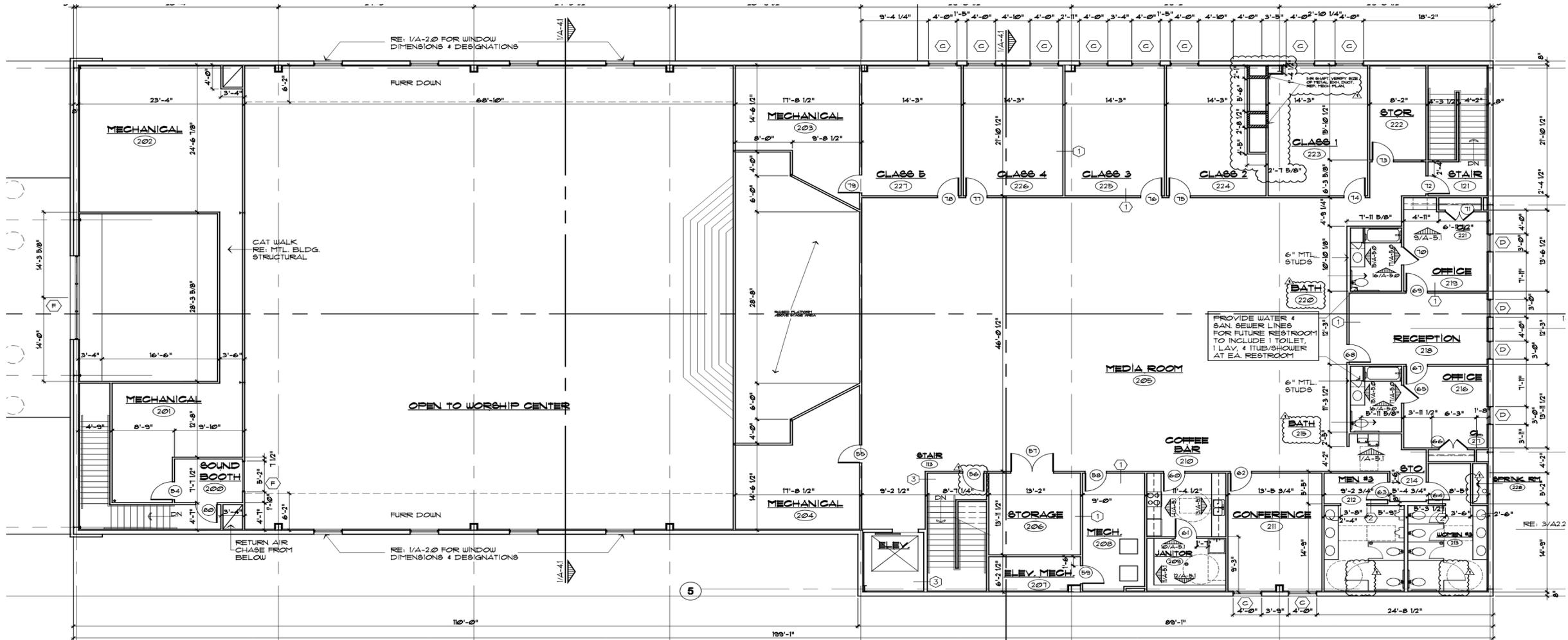


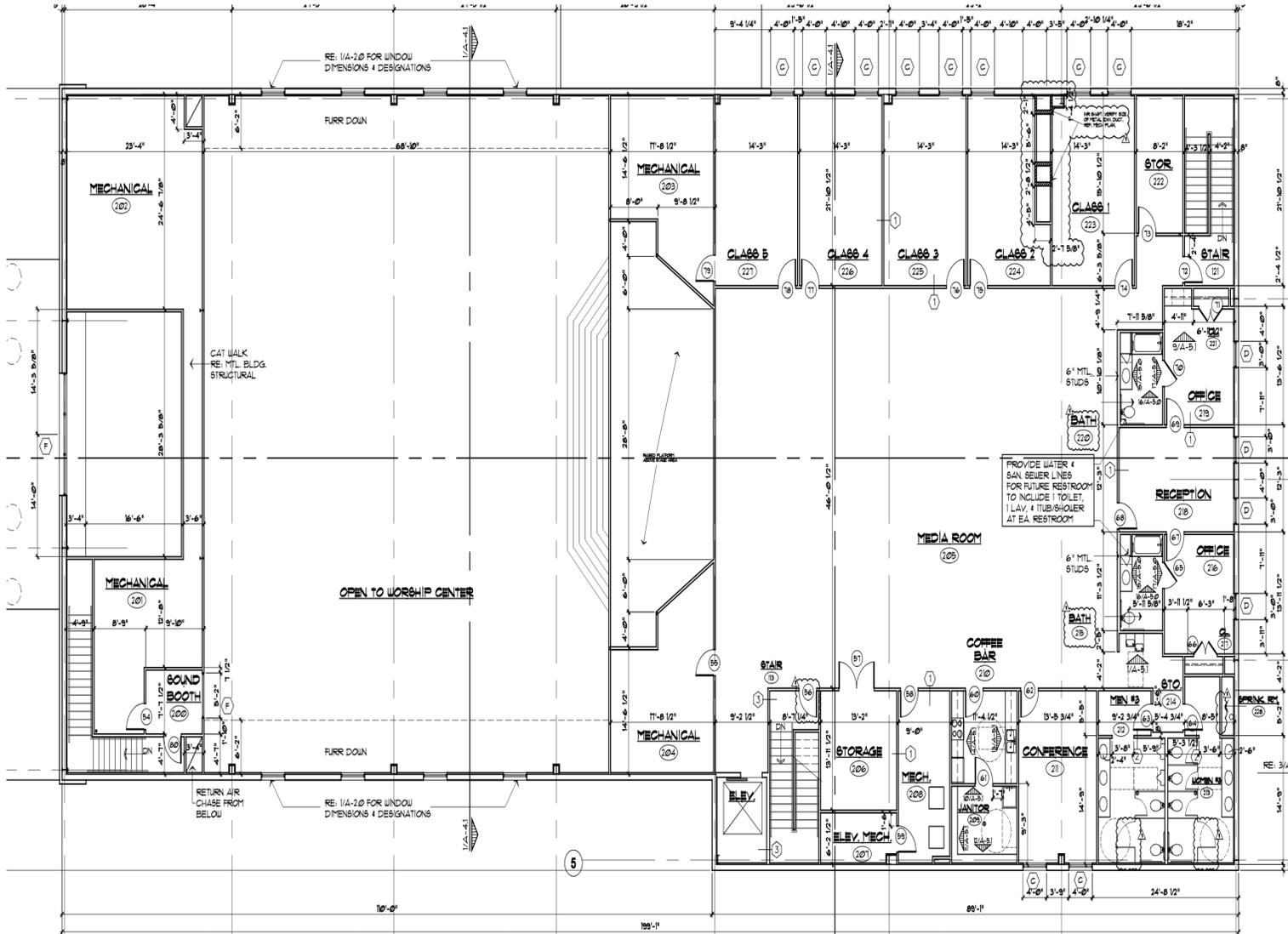
**Yes, you would need sprinklers at 300, unless you have a letter from the Pastor for non-simultaneous use.**

**Section 903.2.1.3**



# HOW DO YOU CALCULATE THE OPEN WORSHIP CENTER THAT HAS CONCENTRATED CHAIRS?



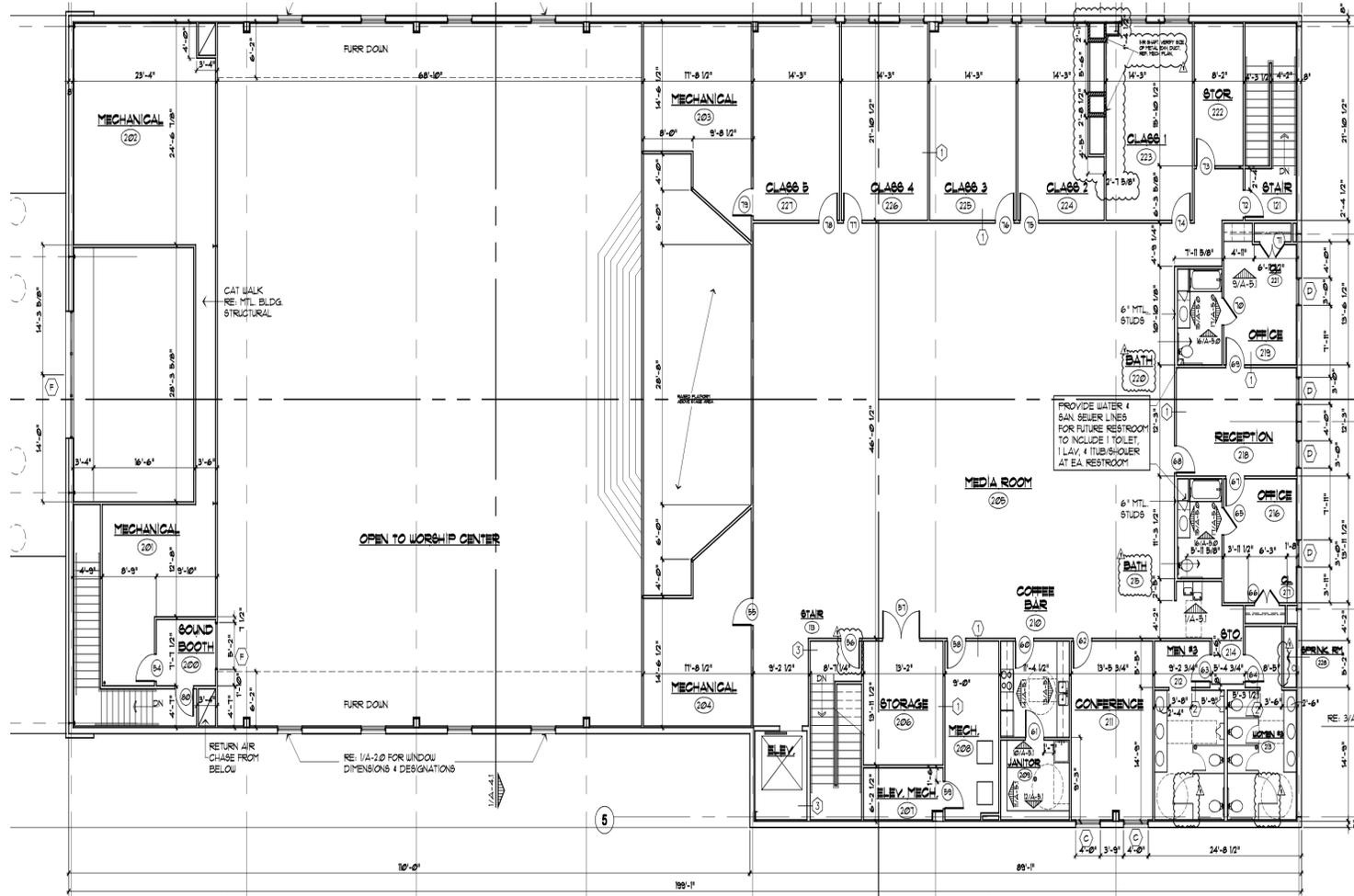


**The factor for sit-in chairs would be 1 per 7 sq ft.**

**The factor for a media room would be 1 per 15 sq ft.**

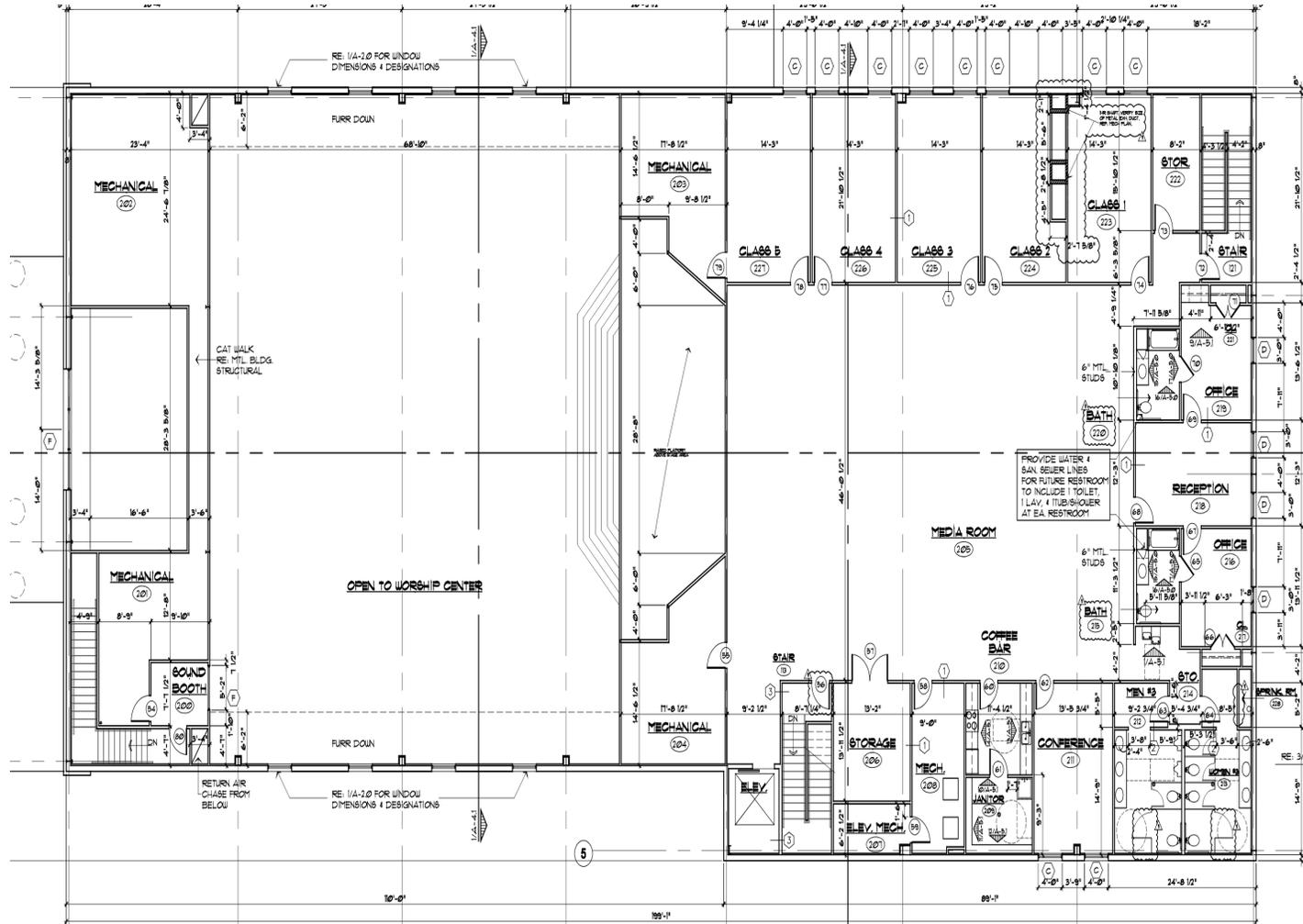
**The factor for a school room would be 1 per 20 sq ft.**

# WOULD THE CLASSROOM BE CONSIDERED SEPARATE USE? WHY OR WHY NOT?



During Sunday school – no.  
Regular school during the week - yes

# CHURCH EXIT REQUIREMENTS

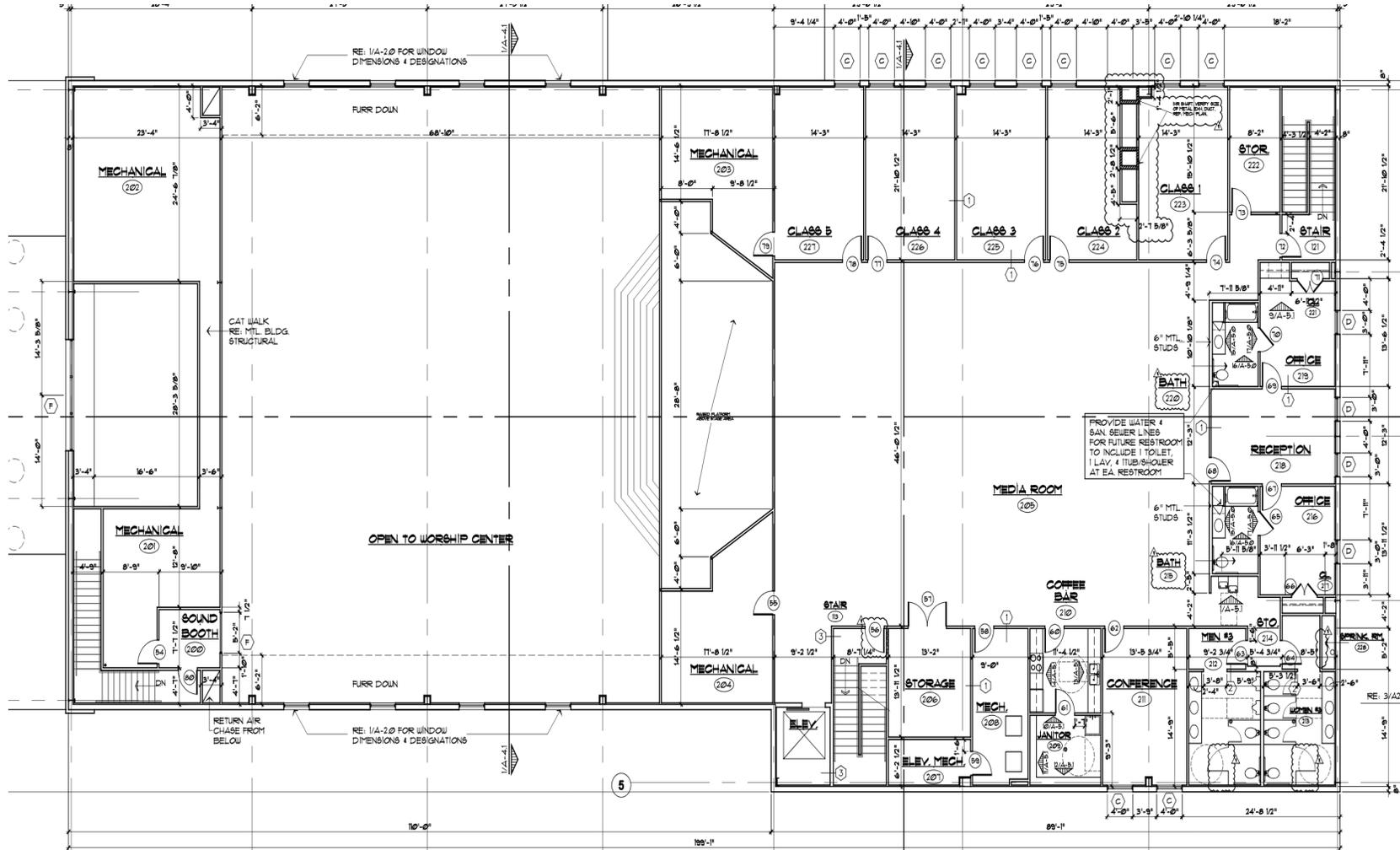


**How many exits are required when you have 600 occupant load?**

**3 exits**

**Note: The sanctuary less than 501 occupant load would be 2 exits.**

# CHURCH EXIT REQUIREMENTS

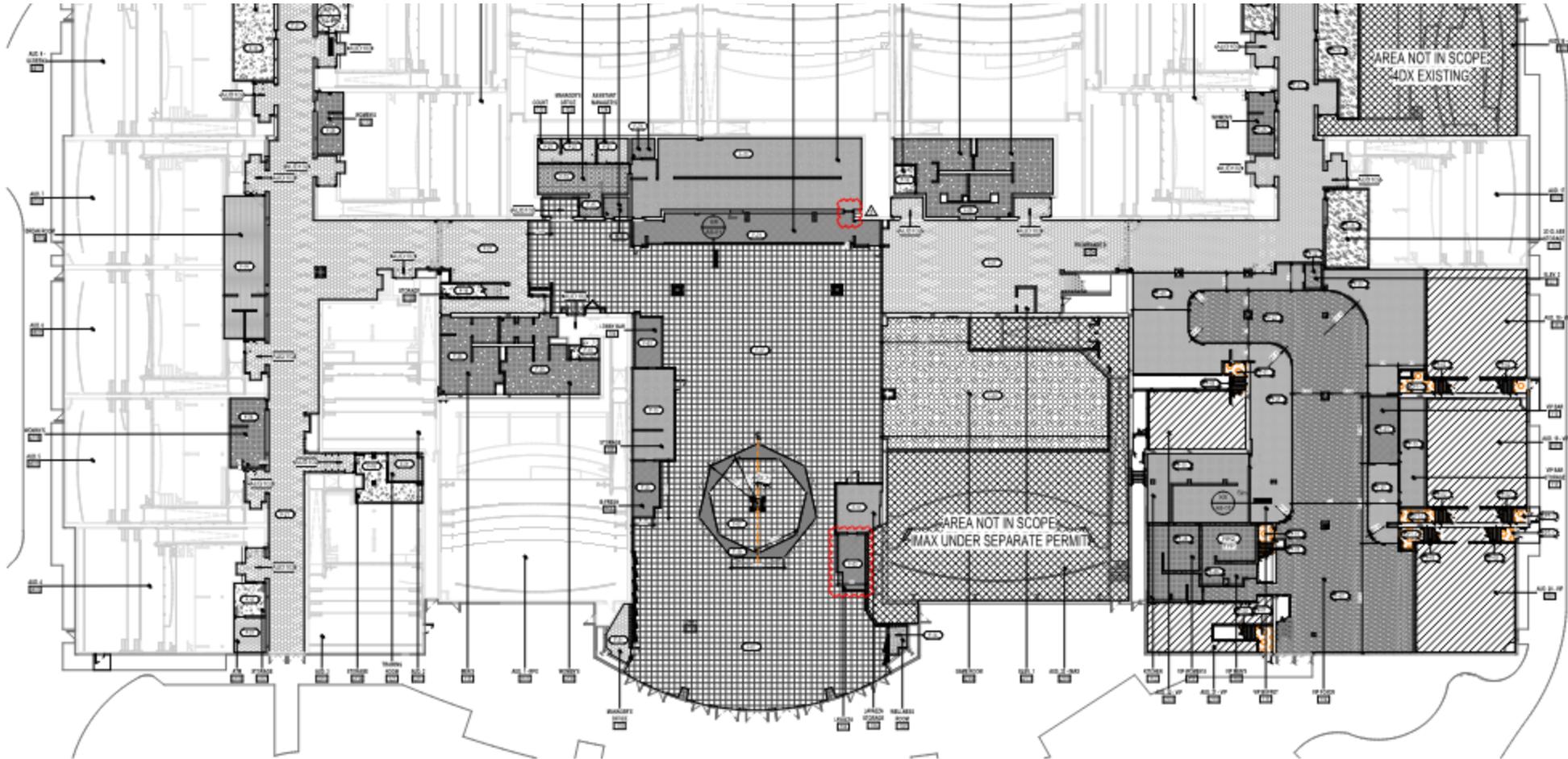


The media room  
over 49 occupants  
would require  
two exits

# **MOVIE THEATERS**

- OCCUPANT LOADS**
- SPRINKLERS**
- EXITING**

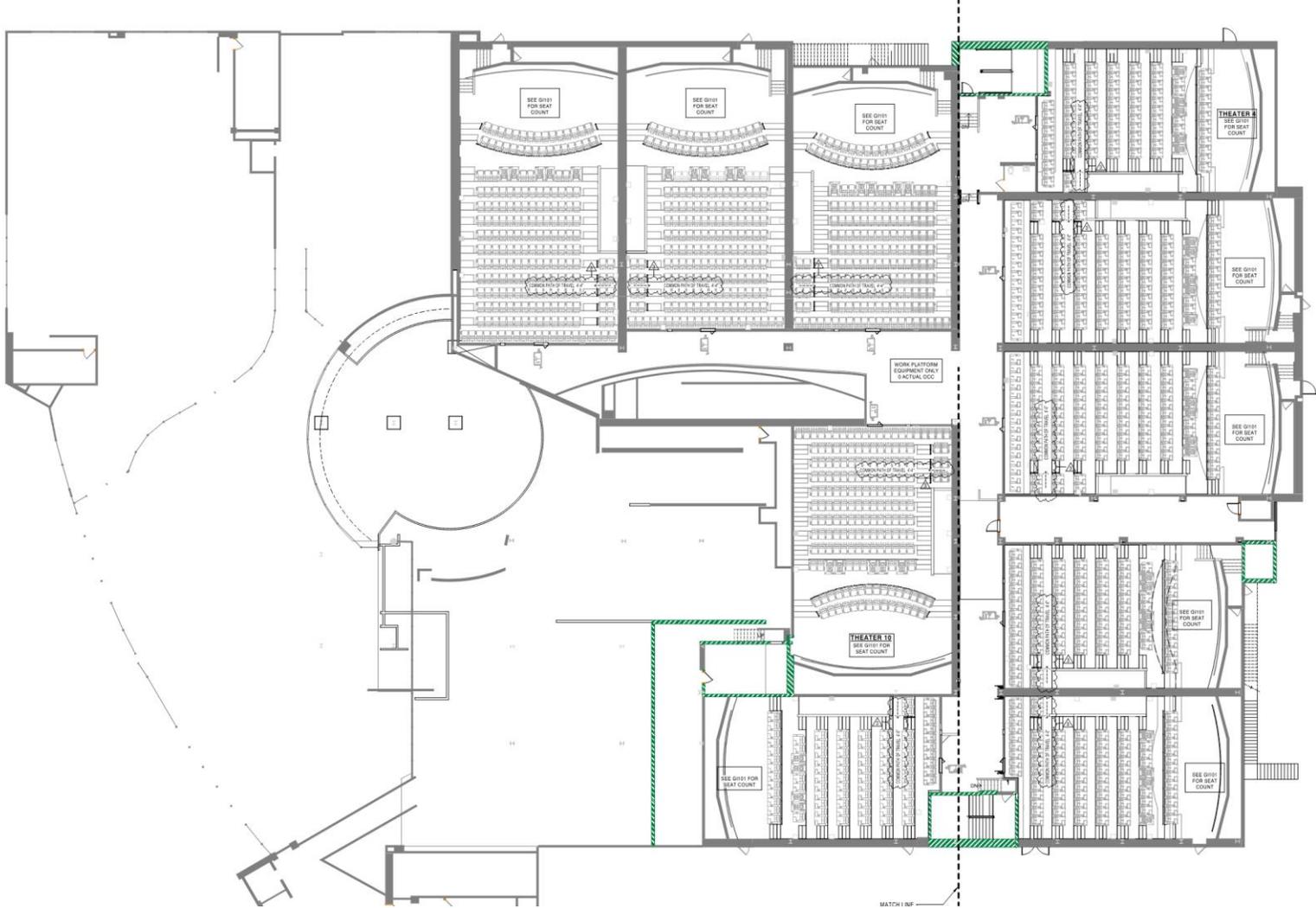
# EXIT REQUIREMENTS FOR MOVIE THEATERS.



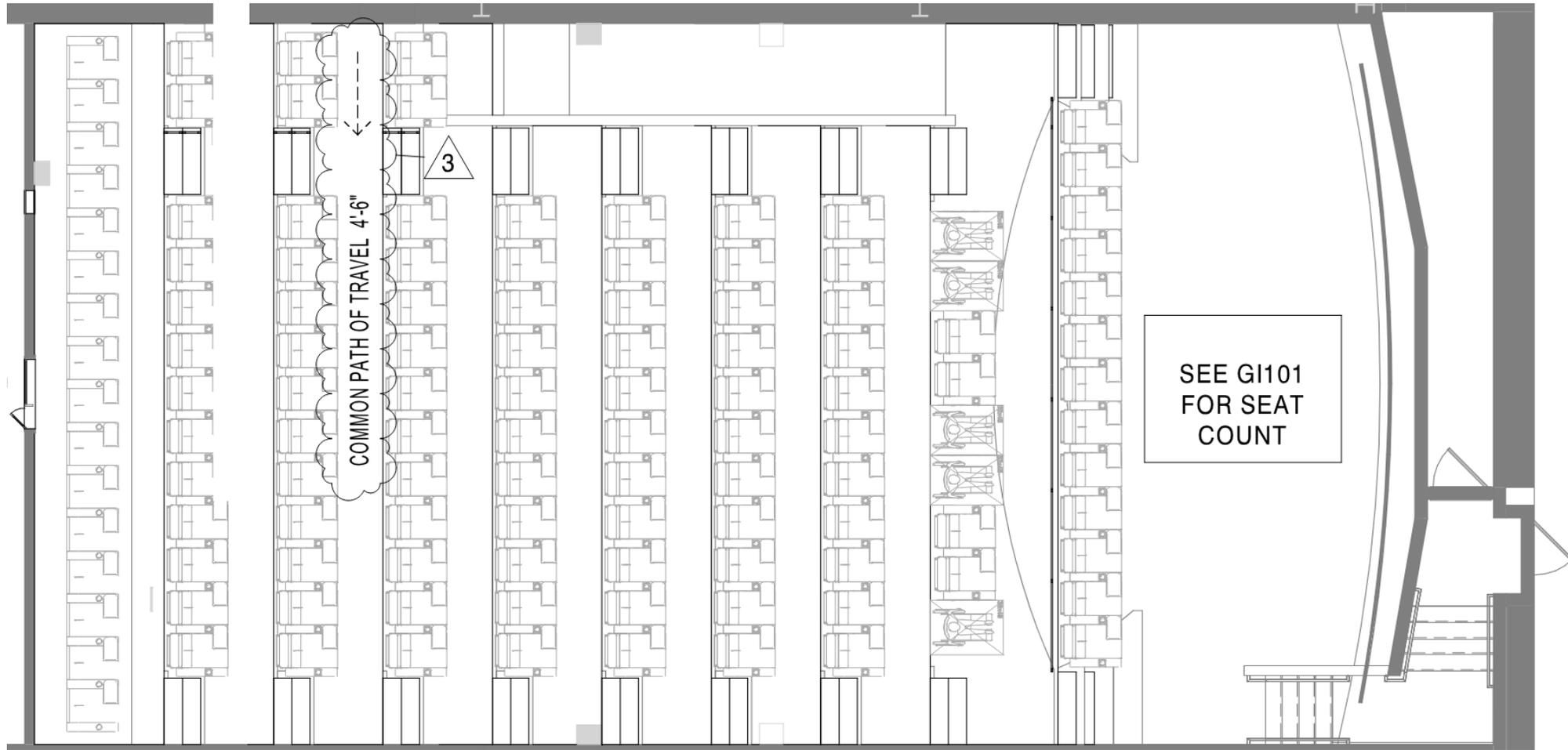
# EXIT REQUIREMENTS FOR MOVIE THEATERS.

The movie theater has fixed chairs.

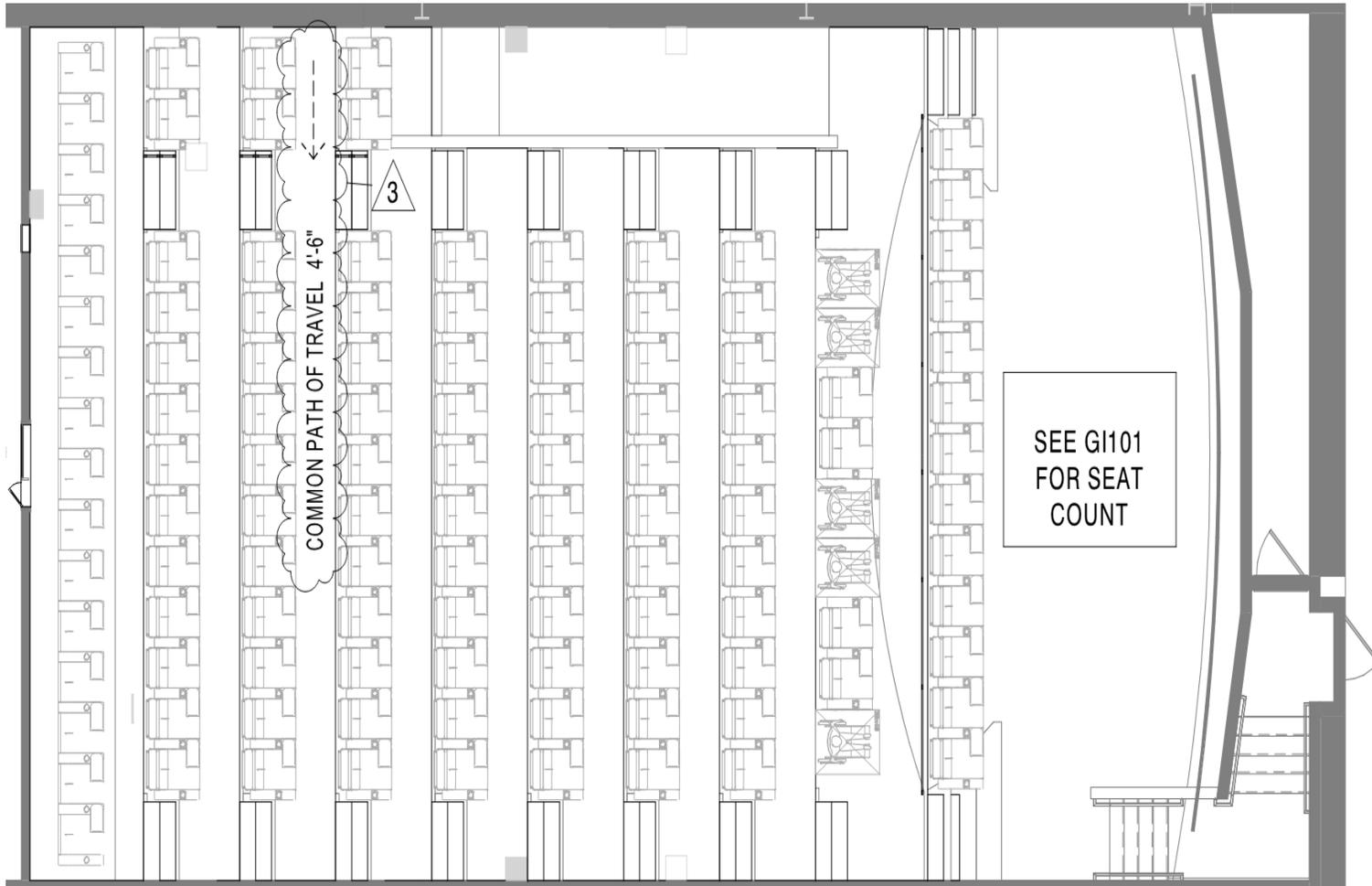
Each room would require two exits with occupant 500 or less.



# MOVIE THEATERS SEATING FIX CHAIRS



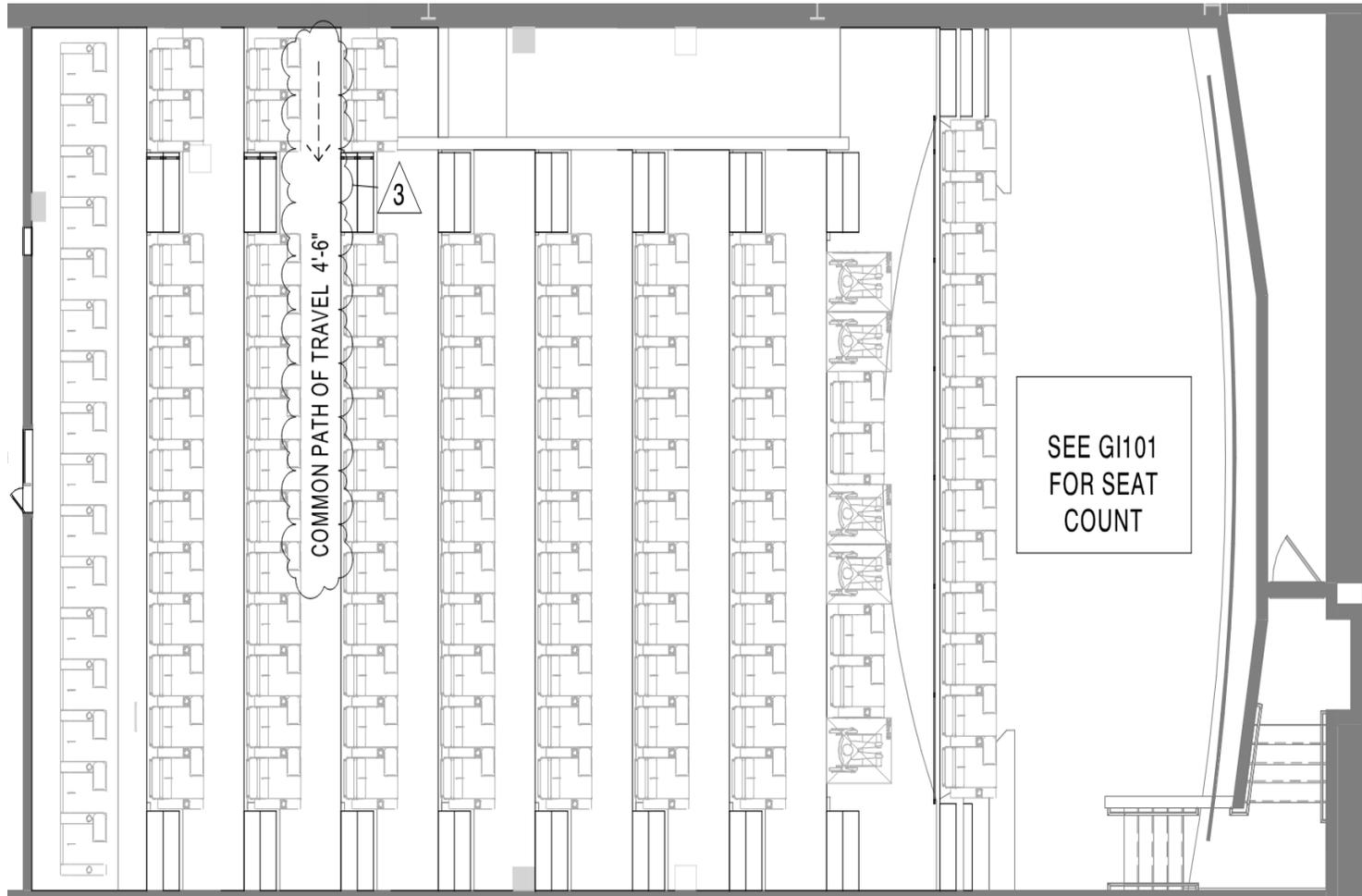
# MOVIE THEATERS SEATING FIX CHAIRS



The common path of egress from any point shall not exceed 30 sq ft.

Section 1030.8  
2021 IBC

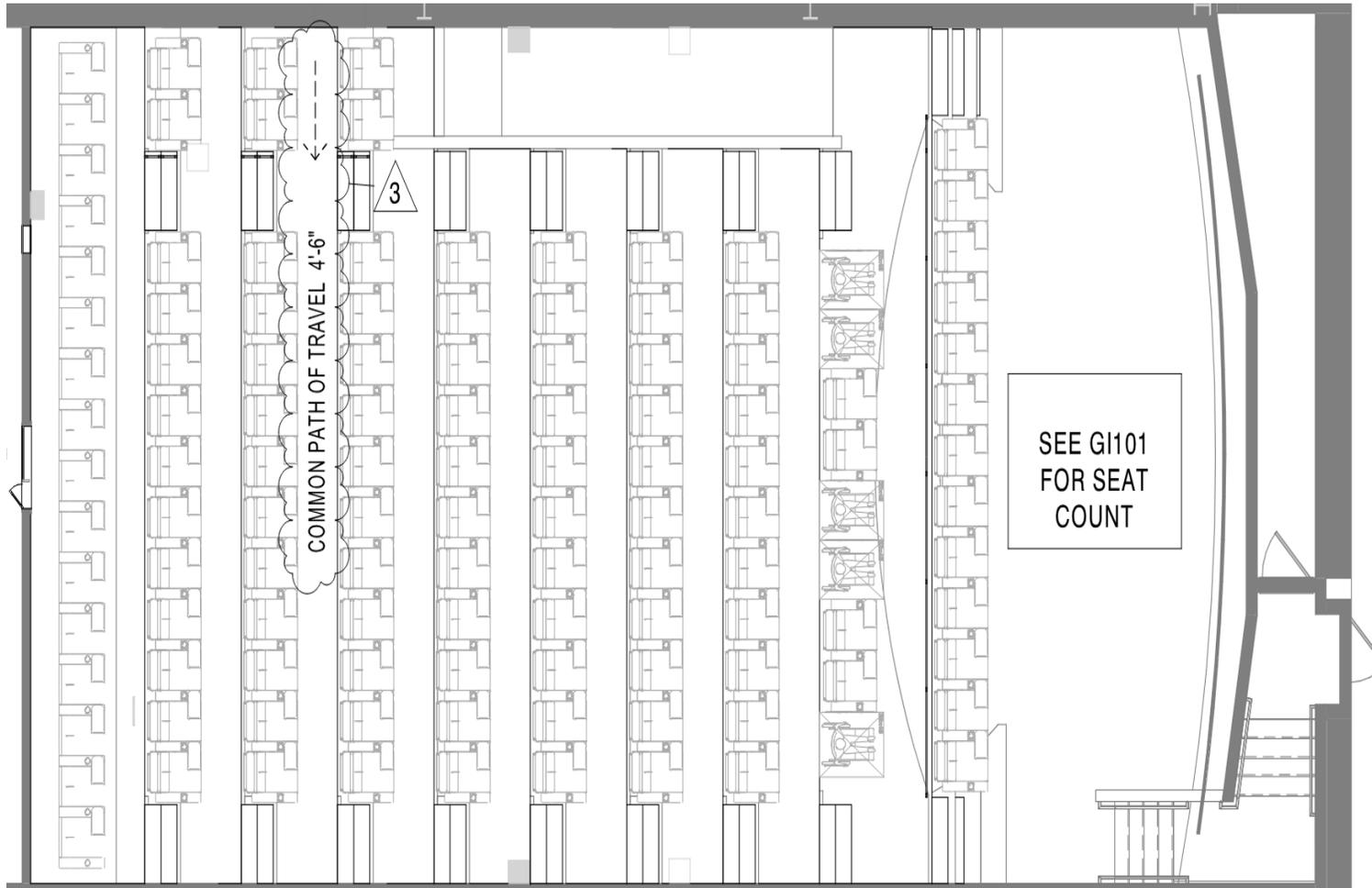
# MOVIE THEATERS SEATING FIX CHAIRS



What is the  
common path of  
egress?

One pathway that  
leads to two  
exit paths.

# MOVIE THEATERS SEATING FIX CHAIRS



**Aisle width requirements:  
Section 1030.9  
2021 IBC**

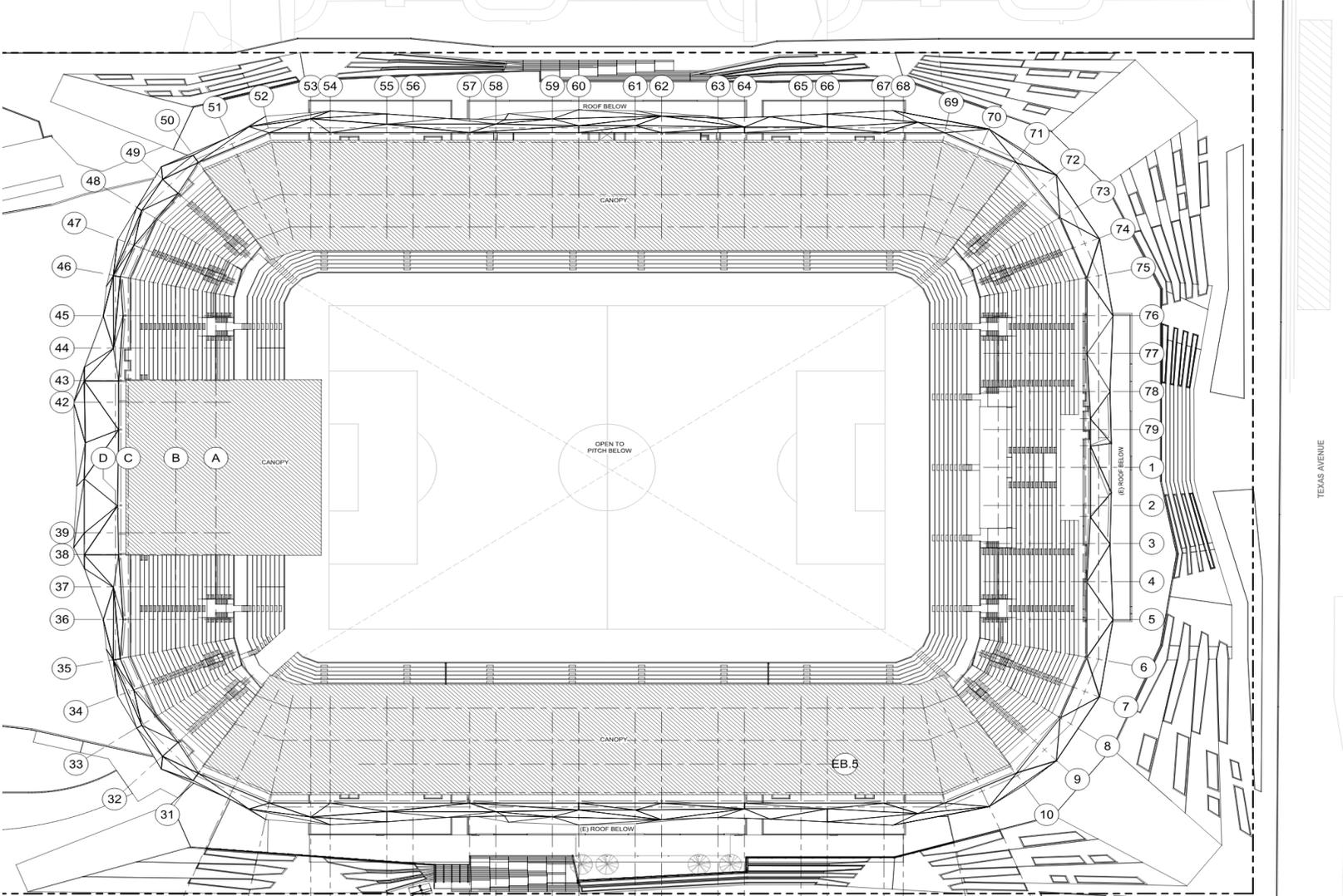
**Seats on both sides of an aisle would require an aisle width of 48 inches.**

**Seats on one side of an aisle would require an aisle width of 36 inches.**

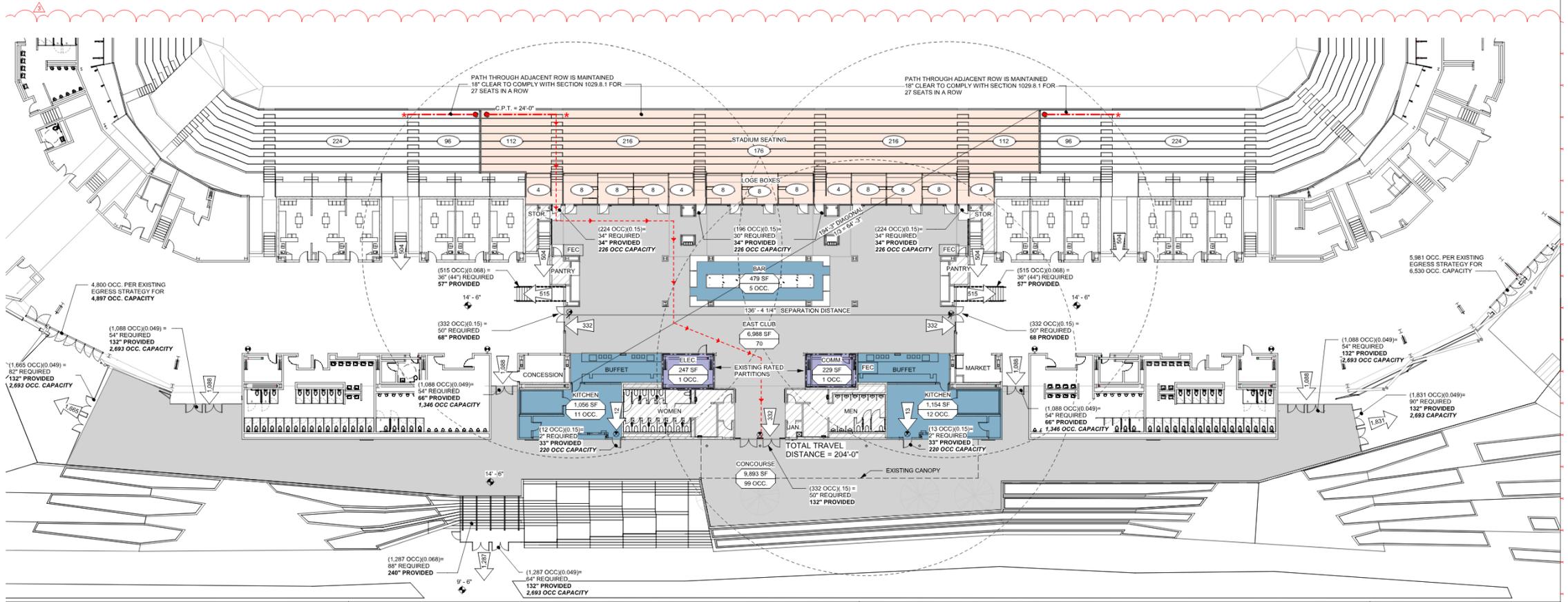
# **STADIUMS**

## **- EXITING**

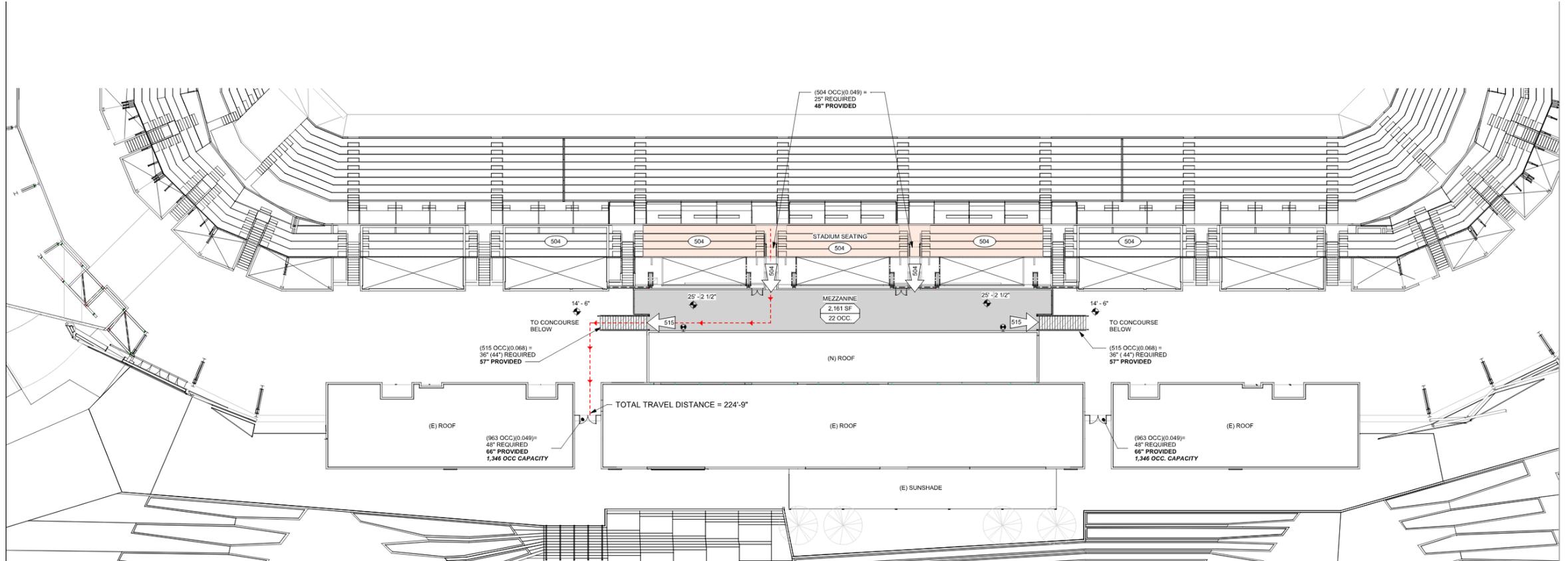
# STADIUMS EGRESS



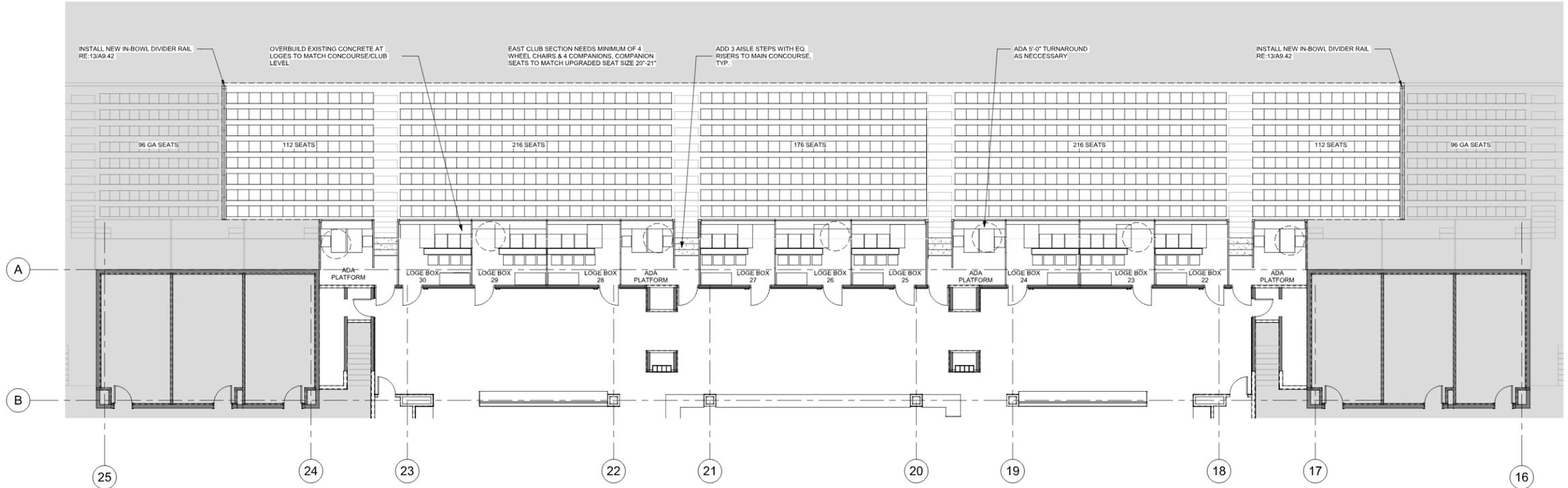
# WHAT IS THE MAXIMUM DISTANCE OF EGRESS TRAVEL?



# WHAT IS THE MAXIMUM DISTANCE OF EGRESS TRAVEL?



# WHAT IS THE MAXIMUM DISTANCE OF EGRESS TRAVEL?



# QUESTION & ANSWER

You Have Questions, We are here to help !!!



# UPDATE

[Learn More](#)

# 2021 Construction Codes

## Adoption Effective January 1, 2024

### Welcome to the Houston Permitting Center

The Houston Permitting Center combines the majority of the City of Houston's permitting and licensing into one convenient location. We opened in June 2011 with a mission to help customers achieve their goals while complying with the City's regulations. Providing excellent service, streamlining business processes, implementing innovative technologies, and proactively engaging customers are all cornerstones of our mission.

#### Office of the City Engineer

The Office of the City Engineer (OCE) implements and administers the provisions in the City's Code of Ordinances state and federal regulations relating to floodplain management, street cuts, and storm water quality.

#### Building Code Enforcement

Building Code Enforcement manages Building Code Services and administers the provisions in the City's Code of Ordinances and state/federal regulations relating to private building construction, and sign administration.

#### Infrastructure & Development Services

The Infrastructure & Development Services agency is part of the Houston Water service line.

# Building Code Enforcement

About Us / Houston Public Works / Building Code Enforcement

Building Code Enforcement manages Building Code Services and administers the provisions in the City's Code of Ordinances and state/federal regulations relating to private building construction, and sign administration.

Building Code Enforcement has over 400 employees and is divided into the following services:

- [Permits and Customer Assistance](#)
- Plan Review
- Inspections
- [Code Development](#)



## CONTACT

PLAN REVIEW

INSPECTIONS

## CONTACT

1002 Washington Ave.  
Houston, TX 77002

832.394.9494

8 am to 4:30 pm

Live Chat

# Contact Us

## Houston Permitting Center



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# SURVEY OF TRAINING NEEDS & TRAINING RATING



# Thank you!



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