MASONIC TEMPLE BUILDING—GRAND ISLAND, NEBRASKA

Life Safety Study

INTRODUCTION

The intent of this report is to provide a general Life Safety Study of the Grand Island Masonic Temple Building, to be used as a guide for future redevelopment of the building. This study is based on the building and fire codes currently enforced in the City of Grand Island. These are the following:

International Building Code (IBC) 2006 Edition with local amendments as enforced by the City of Grand Island Building Department.

National Fire Protection Association's NFPA 101--Life Safety Code (LSC) as enforced by the City of Grand Island for the Nebraska State Fire Marshal.

As indicated above, the intent of this report is a Life Safety Study. There are other codes and guidelines, such as the American with Disabilities Act, National Electric Code, International Plumbing Code, and State Elevator Code that will have their own requirements for modifications to the building when renovation is to occur. While some of these requirements are for life safety purposes, review of the building for these deficiencies is beyond the scope of this report.

EXISTING CONDITIONS

The Grand Island Masonic Temple Building is a 7 story structure with a basement, resulting in a total height of approximately100 feet. It was built in 1925 for the various Masonic orders in Grand Island. In its original configuration the lower 3 floors of the building were used for commercial and office uses. The upper 4 floors were designed specifically for the Masonic rituals and related uses, including large meeting rooms on the 4th, 5th, and 6th / 7th floors. The Masons used the building until very recently—with little changing of the space within the building from the original design. For this reason the existing interior spaces on these floors are of great historical interest and should if possible remain intact. This fact along with the dramatic design of the exterior, of an early high rise building that is still among the city's tallest are what make the Masonic Temple Building a structure of historic significance.

The primary structure of the building is a cast-in-place concrete column and beam assembly with concrete floor joists and slab. The exterior walls consist of brick infill between the columns and beams (as exposed on the side and rear elevations). The roof is also a cast-in-place concrete structure with major beams spanning north-south across the large open space rooms below. Interior partitions appear to be primarily clay brick or tile with a plaster finish applied. Doors, door frames, and interior borrow lites, are primarily made of wood.

Floors 1 thru 6 each have a gross area of around 4,000 SF. Floor 7 is a partial level open to 6th floor with about 1,500 SF. Per IBC, this results in a total building area of 25,500 SF. The basement includes approximately 4500 SF (extending partially under the front sidewalk) but is not included in the IBC calculation for total building area. There is also a mezzanine level at 5th floor with around 500 SF, and as per IBC 505.1 these also are not included in the calculation of total building area. With basement and mezzanines included, the total gross floor area is approximately 30,500 SF.

Vertical circulation includes a single stair at the NW corner of the building connecting the first through 6th floors. 7th floor is reached by a separate interior stair from 6th floor. The stair to the basement is in the same location as the main stair—but is separated by a door. There is also an elevator at the NW corner of the building serving the first through 6th floors. The stair/elevator area is generally separated from the rest of the building—although not with what would currently be considered fire rated enclosure (typically because of the wood panel doors).

The building sits on a lot in mid-block of downtown Grand Island. The shape and size of the lot is the same as the building—generally rectangular with the stair enclosure protruding at the NE corner. The building is surrounded on the north and east sides by lower (approximately 2-story) structures. It is open on the west to Locust Street and to an alley on the south.

Casual observation indicates the building and structure appears to be in very good condition. There are a few areas that show some water damage—either from roof leaks or plumbing issues inside the building. There is very little cracking observable in either the structure or the exterior of the building. The actual structure is visible only in a few areas in the basement and at the roof, but what can be seen appears to be very sound. And in the areas where the structure is not visible, there is little cracking of the plaster, other than from water damage, which would tend to indicate the overall structure is in very good condition and has not moved or settled over time.

REDEVELOPMENT CONCEPT

The intended uses for the building as currently proposed by the Owner are similar to the original uses—a mix of occupancies. These include retail on the first floor (M-occupancy as per IBC), offices (B-occupancy) on second floor, the existing Verizon equipment room (B-occupancy) and apartments on third floor (R-occupancy), a potential assembly room (A-2 or A-3) on fourth floor, an Owner's apartment (R) on fifth floor, and a Dinner Theatre and Bar/Lounge (A-2) on 6th and 7th floors. (The described occupancy for the Dinner Theatre assumes primarily table and chair seating—not fixed seating—and does not have a true stage, therefore is not an A-1 occupancy.) The basement would remain as storage (S-1, assuming continued use for costume storage) and equipment space related to the building in general.

BUILDING OCCUPANCY

Analyzing the use of a building to calculate how many occupants it may have is a major code consideration, as the occupancy determines how the codes require response to certain conditions.

The proposed uses in the building are very similar to the original uses, so in some ways the building is not changing use. The only truly new occupancy is for Residential use. R-occupancies are relatively restrictive due to the existence of sleeping occupants who are less able to detect danger in a building and act in the interest of their own life safety. However, R-occupancy is a low occupant density use as determined by the codes. For this occupancy a factor of 200 SF per person is used to determine occupant load. In this case, with a typical floor area of 4000 SF the calculation indicates a total of 20 people per residential floor. This occupant load is below the threshold of most special requirements or increases needed to meet the basic code needs.

The other more restrictive occupancy is the Assembly occupancy—and as noted, the placement of this use on the upper floors adds to the restrictions placed by this occupancy. Calculating the occupant on the Assembly floors is a little more complicated as there are different conditions to study. As per the sketch attached with this study, we can conservatively estimate the people load on 6th floor in a range from 140 with table seating to around 280 without tables, and an additional 100 or so occupants on 7th level. These numbers may vary from what is actually determined when a building permit is requested—but the key is once we get over 100 people on a floor, some code requirements change. Most importantly, the minimum stair width increases from 36" to 44", and as noted the existing stair is 40" wide—so it is not quite compliant. By calculation per LSC table 7.3.3.1, the existing stair and a new 48" wide exit stair could handle a total occupant load of 300. Other than determining stair width, this occupant load is not particularly large, so other more restrictive code provisions are not triggered by this number.

BUILDING CONSTRUCTION

Based on the observed construction of the Masonic Temple Building as described above, and assuming that the concrete provides adequate cover to the reinforcing steel, this building can likely be classified as either Type I or II Construction as defined by the IBC. Per Table 503, I-B construction is the least restrictive Type that would allow a 100 foot tall building. IBC Section 403.3.1 2. does allow for a reduction in fire-resistance rating from I-B to Type II-A if certain conditions are met—which could be accomplished at this building.

However, the desire for an A-occupancy assembly space at the upper levels of the building is one of the few uses that add Construction Type requirements from the Life Safety Code. Per LSC Table 12.1.6, any assembly occupancy more than 4 floors above the level of exit discharge is restricted in construction to at least a Type II(222), which is comparable to the IBC's Type I-B. The (222) notation references requirements for 2-hour fire ratings for the primary structure, bearing walls, and floor assembly. Generally, the building as it exists may meet these requirements, assuming the adequacy of the concrete coverage on the steel reinforcing bars. Adding the fire resistance of the existing plaster ceilings, would likely assure the 2 hour rating at these areas. And with most existing interior partitions constructed of clay masonry and plaster, the building is nearly a complete 'non-combustible' structure. Therefore, in our interpretation the building should be considered a Type I-B construction and as such meets both IBC and LSC requirements.

Per Table 503 of the IBC, a Type I-B building is allowed an unlimited floor area for any occupancy. Therefore, the Masonic Building can be considered a non-separated mixed use structure per IBC 508.2 and no fire rated separations are needed between the occupancies. (There may be special fire-rated separations required for enclosing the building's transformer and other specific needs but this should be limited and not a major compliance issue.)

The IBC also has requirements for fire rating (Table 602) and size of openings (Table 704.8) at exterior walls based on their distance to property lines. For a building constructed to the property line (as at the north and east), walls must have a 1-hour rating (2-hours at M-occupancies) and no openings are allowed. The building meets the fire rating requirements, but does have existing windows at these walls. At the south, IBC requires that we assume a property line at the center of the alley—a distance of 8 feet from the building. Per IBC, these

walls require a 1-hour rating which the building provides, and openings are limited to 25% of the wall (if the building is fire sprinkled.), which as built the existing building should not exceed. At the west, the building is open to Locust Street and wall fire ratings are not required and openings are not limited.

The existing 6th and 7th floors served originally as the main Masonic Temple meeting room and consist of a 2-story space with seating areas at the 7th level overlooking the room. The west part of 7th floor is also generally open to the 6th floor. The IBC and LSC have provisions for mezzanines, but the 6th and 7th floor condition in total does not meet the exact code definition for a mezzanine. Therefore, 7th floor must be considered as a floor for code purposes. The IBC and LSC generally restrict openings between floors as there typically is the need to keep smoke and fire from spreading through a building and this deficiency will need to be addressed. However, IBC and LSC recognize balconies/galleries as part of an assembly space, so that closure is not required at these locations. The needed floor closures can likely be achieved by self-closing doors—with magnetic release holders if it is desired to have these doors stand open.

There is also a small between the floor space at fifth level that again does not meet the exact code definition for a mezzanine. If this area is for non-habitable uses, such as for HVAC equipment, this is probably not a major issue and no additional separation will be required.

The building does not have a fire sprinkler system. Both the IBC and LSC require a fire sprinkler system for the building based on the intended Assembly occupancy use. The sprinkler is also required because by the high-rise condition of the building. Therefore, an NFPA Type 13 sprinkler system must be installed throughout the entire building. IBC (Section 905) also requires a standpipe, most likely a Class I type. The existing building has a standpipe system, but may need to be replaced or at least modified to meet the current code requirements.

MEANS OF EGRESS

Means of egress is discussed in Chapter 10 of the IBC and Chapter 7 of the LSC, and these requirements indicate several major issues to be corrected of the Masonic Temple Building as it stands. The most glaring deficiency is the provision of only one stair system to serve the entire building—and this stair stops at 6th floor. (7th floor is served by a separate stair.) As constructed, the one stair system does not quite meet all current code requirements. The stair shaft construction, consisting of 4" clay tile with plaster on each side likely does provide the needed 2-hour fire rating (IBC Table 720.1 (2)-Item 5-1.5). However the existing doors to the stair enclosure that do not have the proper fire rating. Also, as noted later the high-rise building requirements include the need for a smokeproof enclosure for the stair per IBC 1020.1.7.—which is not present but can be provided by adding a fan system to pressurize the shaft.

This existing stair is a40" wide, or slightly smaller than the minimum width of 44 inches required to serve more than 50 occupants as per the IBC and LSC. Most of the stair has a rise height or tread depth that is slightly outside the current requirements of the IBC. Rise height is typically about 7-1/2", while 7" is the current IBC maximum. These typical dimensions are within the limits of the LSC, which has requirements for existing stairs (Table 7.2.2.2.1 (b)). The existing guardrails and hand rails do not match current code requirements.

IBC 3002.7 does not allow elevators and stairs to share a shaft enclosure which as constructed the condition at the NW stair. To correct this condition may require a different placement for the doors into the stair, or adding smoke closures at the elevator doors to meet the intent of the code.

The separate stair from 6th to 7th floors is also too narrow, is not fully enclosed, does not provide a continuous access path to an exit stair system, and has rise and tread dimensions that do not meet code—including the LSC code for existing stairs.

The basement also requires a second means of egress. There are 2 existing stairs from the basement—one that connects to the main stair system at the NW and one at the east that only extends to first floor. This stair as currently constructed does not provide a continuous egress path to an exterior exit door, but this could be easily done.

And as a final deficiency, there is no stair to provide access to the roof as required by IBC 1009.11.

Therefore the main egress deficiency and the main code deficiency in the building is the lack of a second code compliant stair system. There are 3 possible solutions to provide the needed second stair, each of which has issues to resolve.

First, would be to find a space within the building where a second stair could be constructed. Finding a location is the difficulty for this solution. A second exit stair would ideally be placed at the SE corner of the building to provide maximum separation between exits. Trying to construct a stair anywhere inside the east end of the building would require it to be built directly through the most historic and significant of the existing interior rooms. With addition of a fire sprinkler, the codes allow the stairs to be considerably closer together than this—a distance equal or greater than 1/3 the diagonal dimension of the floor. Using this allowance and with careful placement of the stair doors to achieve the needed distance, a stair could be located along the south wall of the building with shaft construction just to the west of the main historic rooms. This solution due to the required demolition within the building would likely be the most costly option as unknown conditions could result in a need for complicated solutions. In addition, from an Owner's standpoint, this solution would be additionally costly as it results in a decrease in the amount of space that could be leased or sold.

The other 2 solutions would require a stair to be constructed outside the building wall—in the air space, either over the adjacent private property which would require a legal easement, or by a legal agreement with the City to use the alley space. Ideally, the stair should be constructed in a consistent footprint continuously all the way to grade. This is likely only possible at the adjacent private property, as the stair footprint would take up too much space in the alley. If the stair is constructed on the adjacent property, it will need to be built in a 2-hour fire rated shaft structure to protect the stair. An open fire-escape stair is not allowed.

Either air space approach does not require the stair to be outside the building walls all the way to street level. A stair structure could traverse down the exterior and reenter the building at fourth or third floor and be constructed inside the building where the interior spaces are not as significant to the building's character and discharge to the alley. This would make the alley location less intrusive.

HIGH RISE BUILDING REQUIREMENTS

The Masonic Temple Building as noted previously is 7 stories tall, with the uppermost floor approximately 85 feet above the lowest level of fire department vehicle access. This makes the structure a high-rise building, as defined by IBC Section 403.1. As such, there are numerous IBC requirements for high-rise buildings that currently do not exist in the building. Life Safety Code Chapter 11 also addresses high-rise buildings, but these requirements are generally matched by those in the IBC. Many of these requirements are for additional systems and equipment, and while costly would not result in major modification of the building structure itself—with one exception. These include:

- Automatic fire sprinkler system (IBC Section 403.2)
- Automatic fire detection system (IBC Section 403.5) requiring smoke detectors as part of an alarm system in certain locations noted .....
- Emergency Voice / Alarm Communication System (IBC Section 403.6)
- Fire Department Communication System (IBC Section 403.7)
- Fire Command Center (IBC Section 403.8 and LSC 11.8.5.), of not less than 96 SF in size and separated from building by 1-hour fire rated construction —location and features subject to approval by local fire officials.
- Elevator (IBC Section 403.9), to comply with Chapter 30, which with replacing of the elevator system and added upgrades to the shaft and elevator equipment room, can be achieved in the building.
- Standby Power System (IBC Section 403.10)
- Emergency Power System (IBC Section 403.11)
- Stairway Door Operation (IBC Section 403.12)
- Smokeproof exit enclosures (IBC Section 403.13)
- 2-hour rated stair shafts (IBC Section 707.4)—the existing construction of clay masonry with plaster each side may meet the 2-hour construction requirements.
- Seismic Design (Per IBC Chapter 16 and the Grand Island City Code—Section 8-3, building design must meet the requirements for Seismic Category A, Site Class D.)

The last item listed for seismic design is the one that if enforced would result in the possibility of significant modification to the building structure to meet the current requirements.

Section 403.4 does allow high-rise buildings to omit the requirement of Section 1026 for emergency escape and rescue openings. This means, windows do not need to meet the size and operation requirements for emergency openings which often times historic window configurations cannot provide.

EXISTING CONDITIONS AND THE BUILDING CODES

With most any existing building, there are conditions that do not meet current code requirements. Some of these conditions are relatively easy and inexpensive to correct, some are easy but expensive to correct, and others are both difficult and expensive to correct. The

Masonic Temple Building has some of all 3 types of conditions that will need to be addressed if the building is to be redeveloped and reused.

Code documents and their requirements attempt to be very black and white to make it easier to determine what needs to be done to meet those requirements. As can often be the case in older buildings, the available solutions to the code deficiencies may not be able to provide total black-and-white compliance to those requirements. So, the ideal approach is to take a step into the 'gray' areas and try to look for solutions that may meet the intent, if not the letter of the code—with the intent being to improve life safety to the greatest reasonable extent. With this approach analysis and review of these problems need to use more general guidelines to determine what can and should be done, and what can't and should not be done.

First, any new work that is to be done in an existing building must comply with the letter of the law. But within limits, other existing conditions that do not meet code requirements might not need to be corrected as a result of the new work.

Second, any work done to a non-conforming condition cannot increase its non-conformity. This would include changing the use of a part of the building to one with a more restrictive use or a larger occupant load as that would increase the risk to life safety.

And third, a term 'legal non-conformity' may need be used to identify conditions that were created in the original building that conformed to the code at that time, but are no longer in compliance. At the discretion of the agency having jurisdiction of the codes, these conditions may be 'grandfathered' and maintained if they do not increase the danger to life safety in a building beyond a reasonable limit.

In total, the intention of these guidelines is that in an existing building, and changes made in occupancy, use, layout, construction , or other areas should at the very least not reduce life safety, but ideally improve safety in the structure to the extent that continued use of the building is possible. For example, adding a fire sprinkler system to a building will often correct some of the non-compliant conditions while improving the overall life safety of the building even where non-compliant conditions are allowed to remain.

CONCLUSIONS

With this analysis and discussion, following are the major conditions in the Masonic Temple Building that are not in conformance with the Codes and possible approaches to resolve those issues. These are roughly in order of importance—and likely in order of cost.

No matter what else is done in the building, constructing a second egress stair to provide the required second exit from each floor is a necessity. While this single stair is an existing condition, this is a life safety requirement that must be met, even though it may have been 'legal' when the building was constructed.

Similarly, an automatic fire sprinkler system must be added to serve the entire building. As noted above, this is required on its own for the type of building and use envisioned for it. But adding a fire sprinkler can eliminate or reduce other requirements that would have to be met is this system was not used.

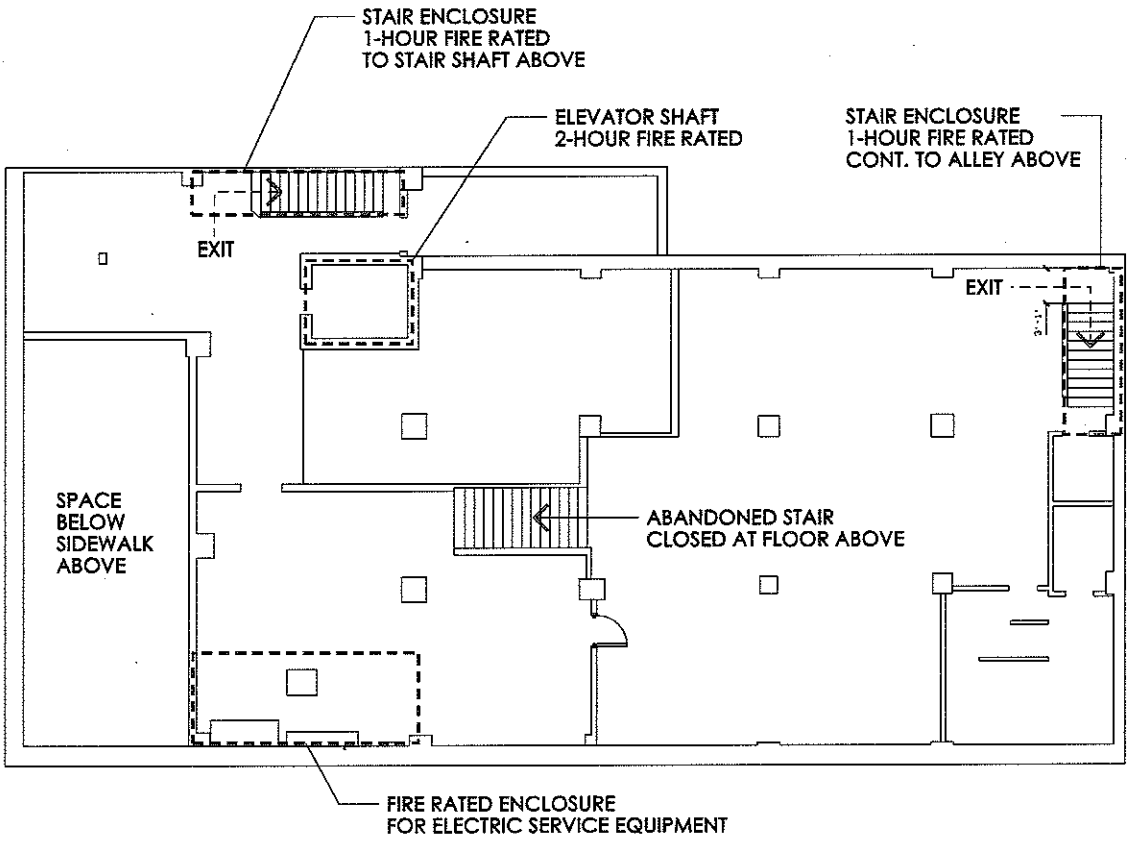
Make the changes needed to meet the other specific requirements for high-rise buildings, except for conformance to the seismic design standards. As noted, these high-rise requirements consist mostly of equipment and systems that need to be added, but do not significantly alter the physical structure of the building.

Resolve the miscellaneous openings between floors—specifically at 6th and 7th levels—and the associated exit issues on these floors. These issues start to get into those where the existing conditions need to be analyzed as to how life safety can be improved without necessarily meeting the full list of code requirements that may be involved. This would include the need for all new work to meet the existing code requirements, and using other means—such as providing the second exit stair and adding a fire sprinkler system—to increase life safety to the extent other non-conforming conditions can be allowed to remain in place.

The IBC requirement to meet seismic design standards will likely need to be considered as a 'legal non-conformity' based on the fact that the building has stood for 85 years as designed and meeting current standards may be 'technically unfeasible' due to the cost of modification.

The existence of windows in the exterior walls on the building's property lines will also need to be considered as a 'legal non-conformity', with the understanding that future development of the adjacent properties could affect the continued use of these windows.

The Masonic Temple Building is a unique and impressive structure that is an important part of the Grand Island skyline and history, and its continued use should be seen as a desirable benefit to the City. The building is in good physical condition, and there is much in its original design and construction that makes its continued use possible if an increased degree of life safety can be provided for its future occupants. Ideally this study will provide a useful framework for future renovations plans and serve as a starting point for resolving the life safety issues identified when time comes to apply for a building permit.



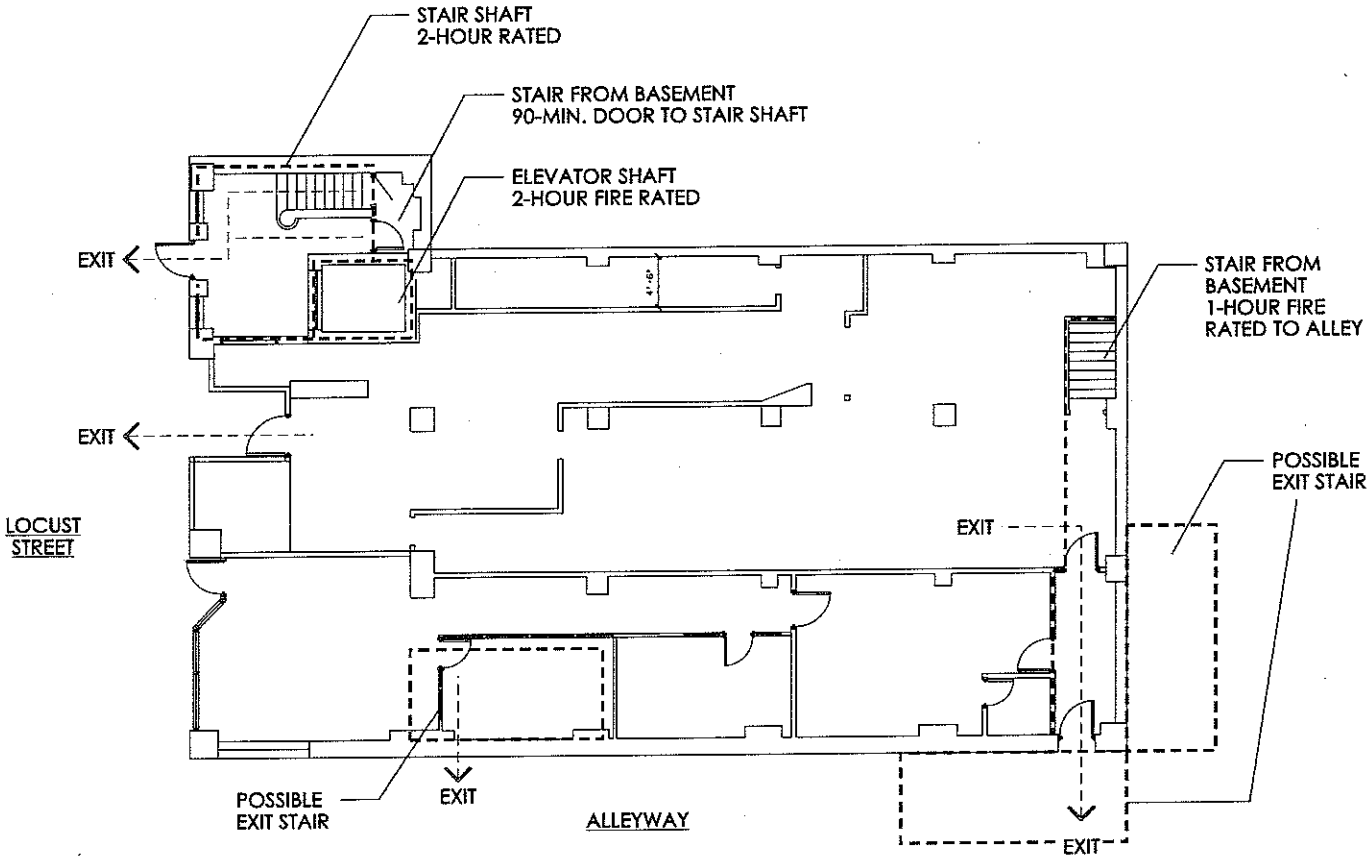
Basement Plan

Scale - 1" = 16'-0"

S-1 OCCUPANCY - STORAGE

SINCLAIR hille architects

NORTH



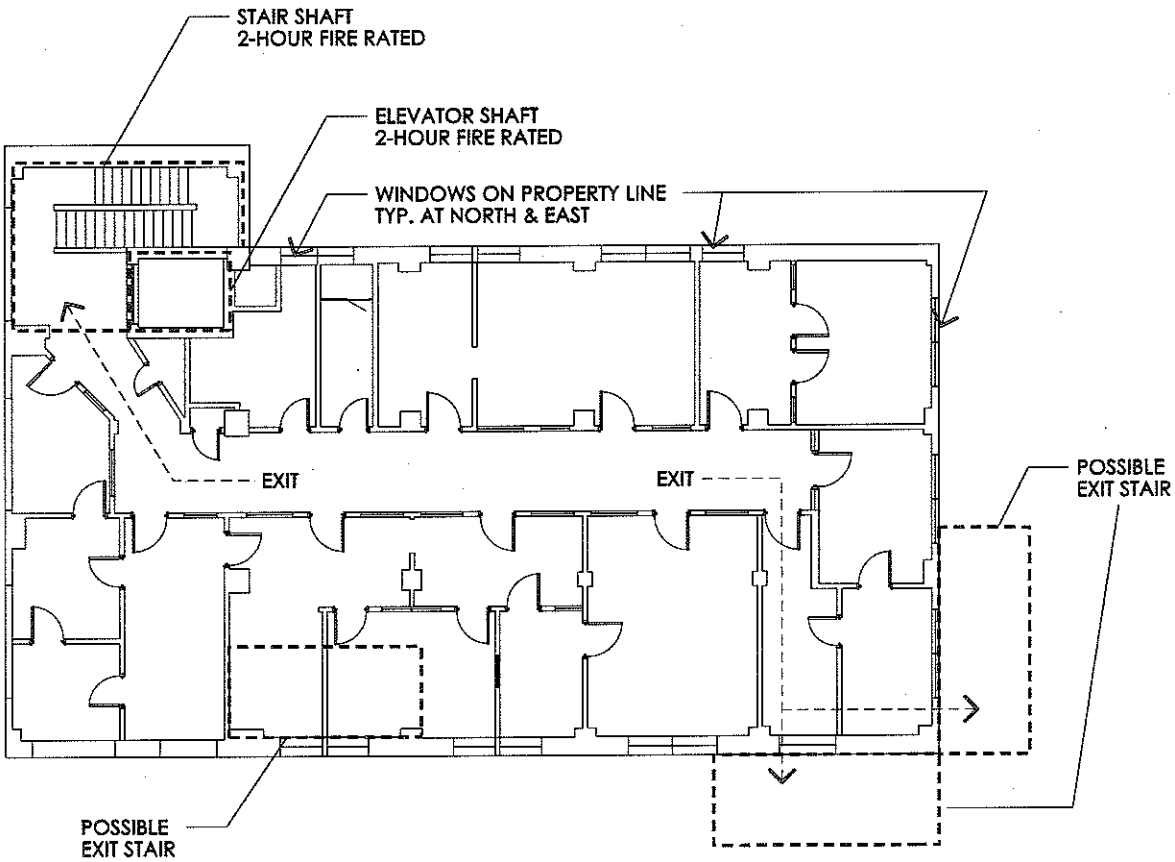
First Floor Plan

Scale - 1" = 16'-0"

M - OCCUPANCY - RETAIL

SINCLAIR hille architects

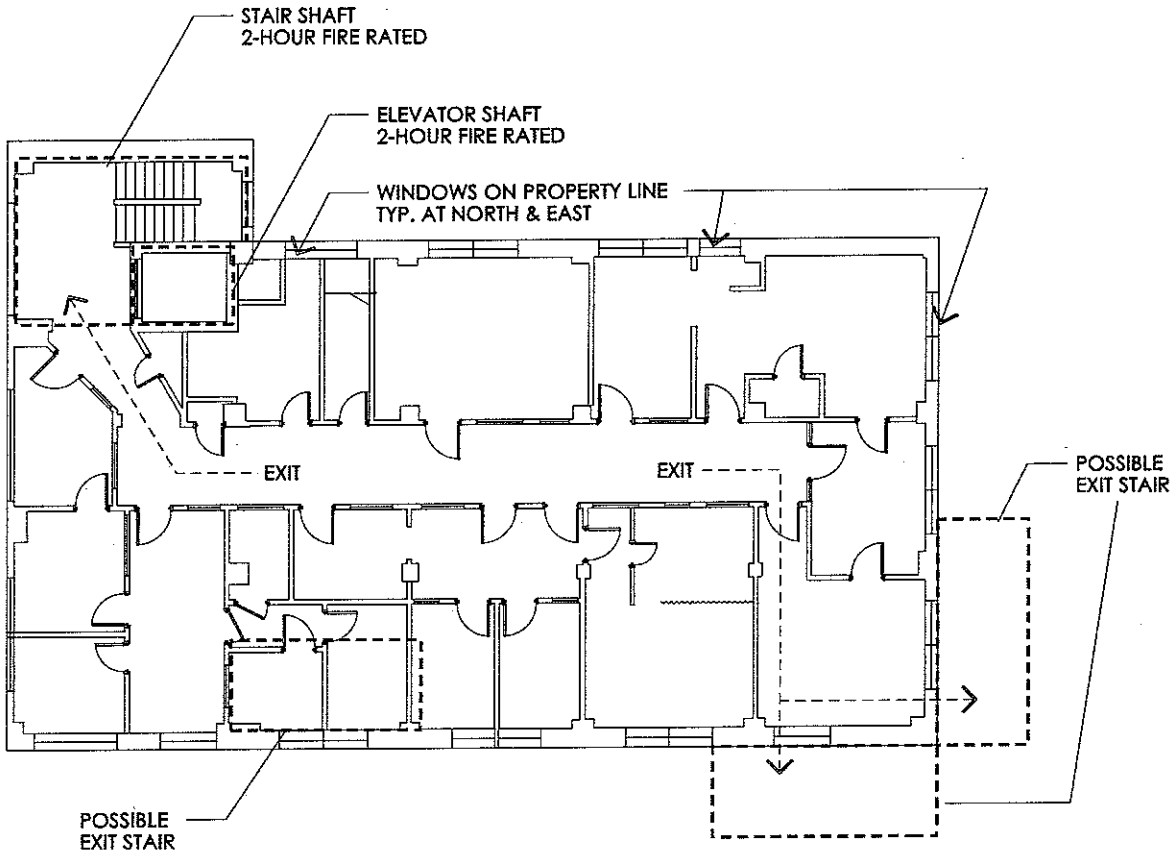
NORTH



Second Floor Plan

Scale - 1" = 16'-0"

B - OCCUPANCY - OFFICES



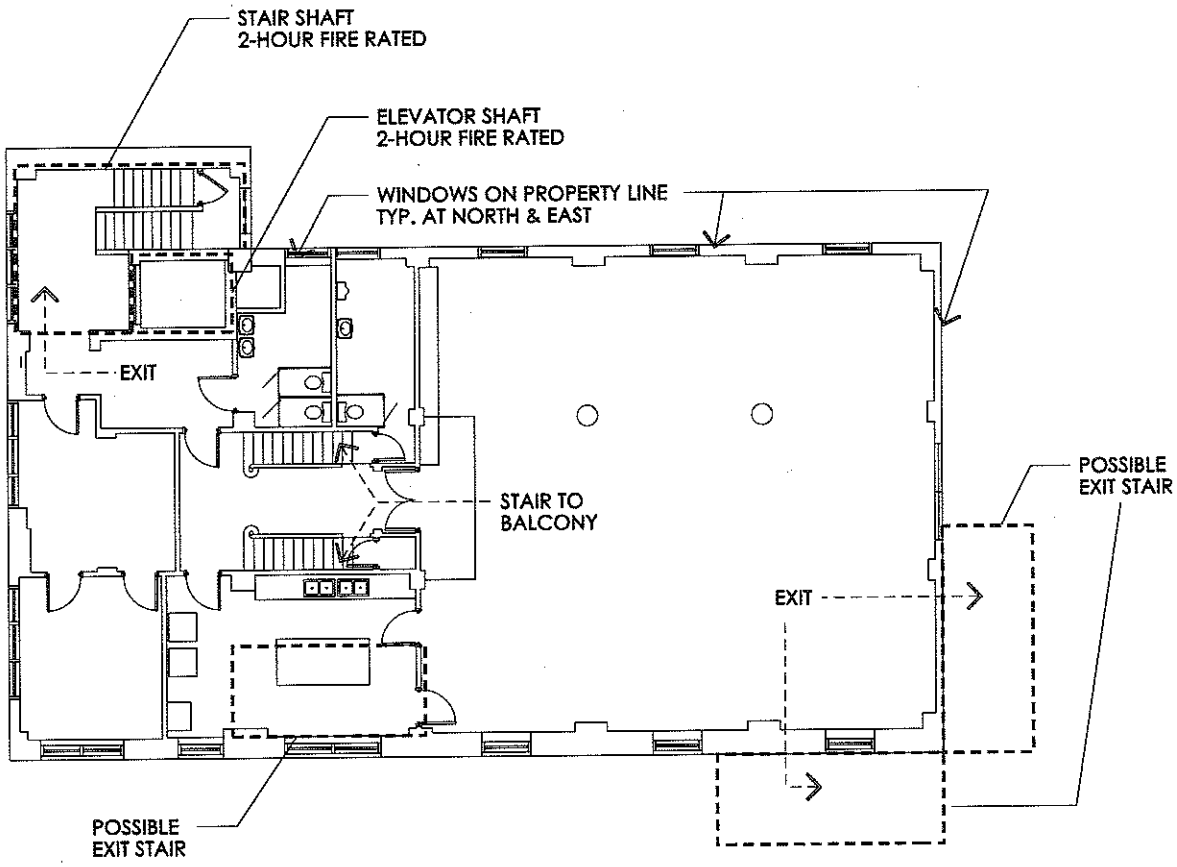
Third Floor Plan

Scale - 1" = 16'-0"

R-2 OCCUPANCY - APARTMENTS

SINCLAIR hille architects

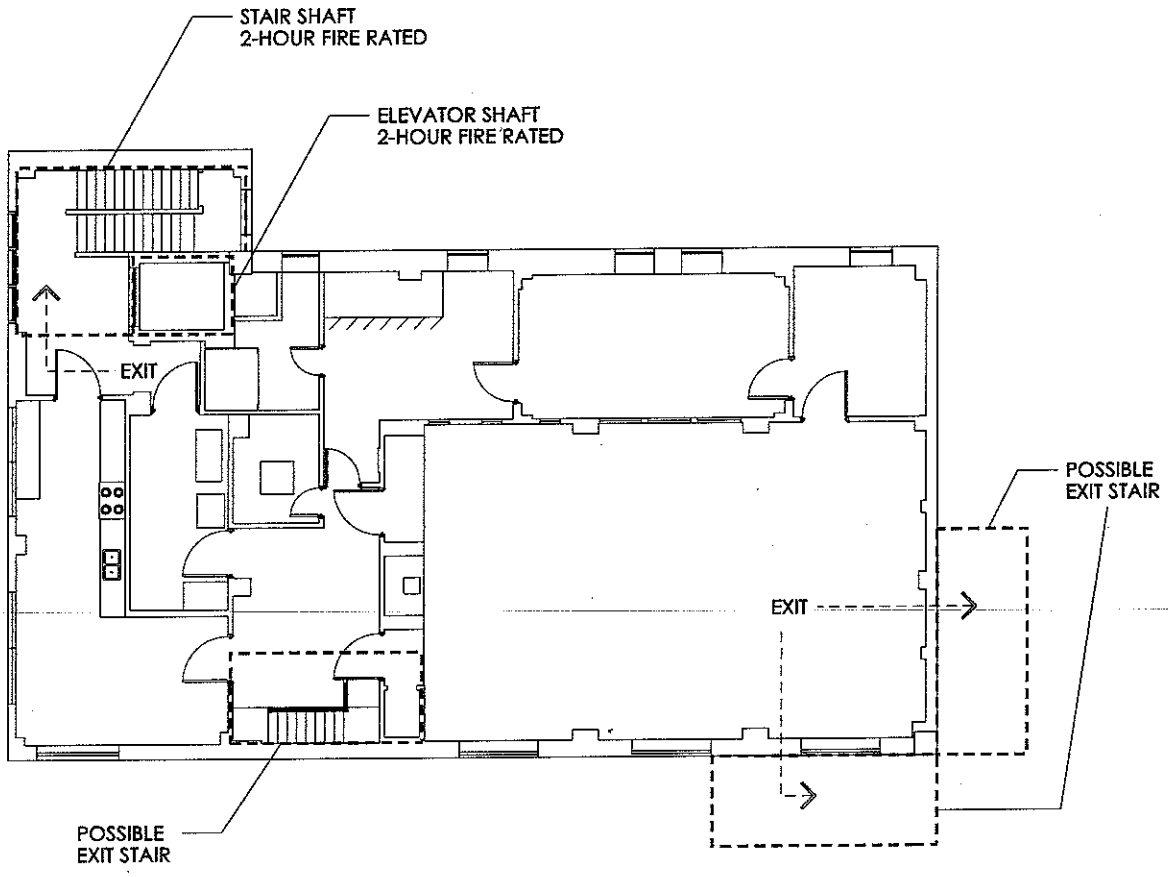
NORTH



Fourth Floor Plan

Scale - 1" = 16'-0"

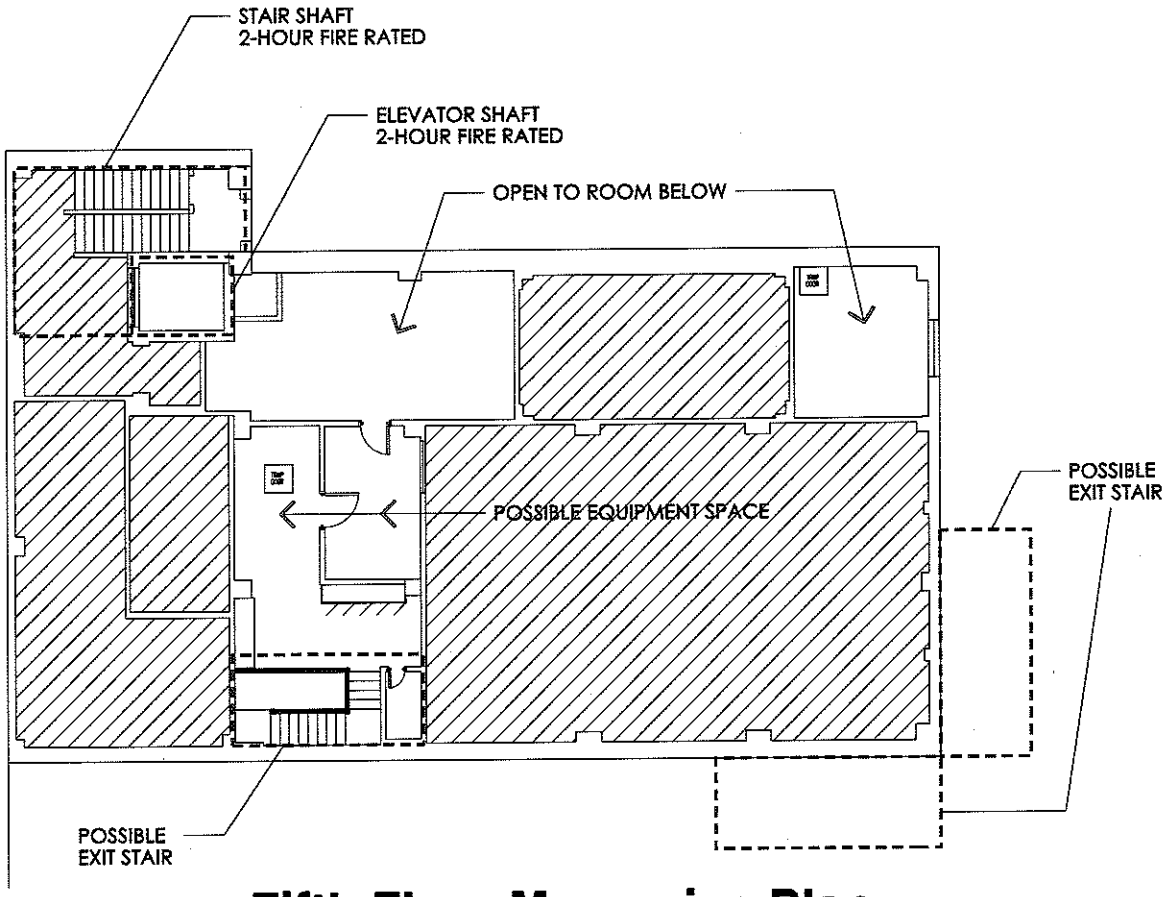
A-2/A-3 OCCUPANCY - MEETING ROOM



Fifth Floor Plan

Scale - 1" = 16'-0"

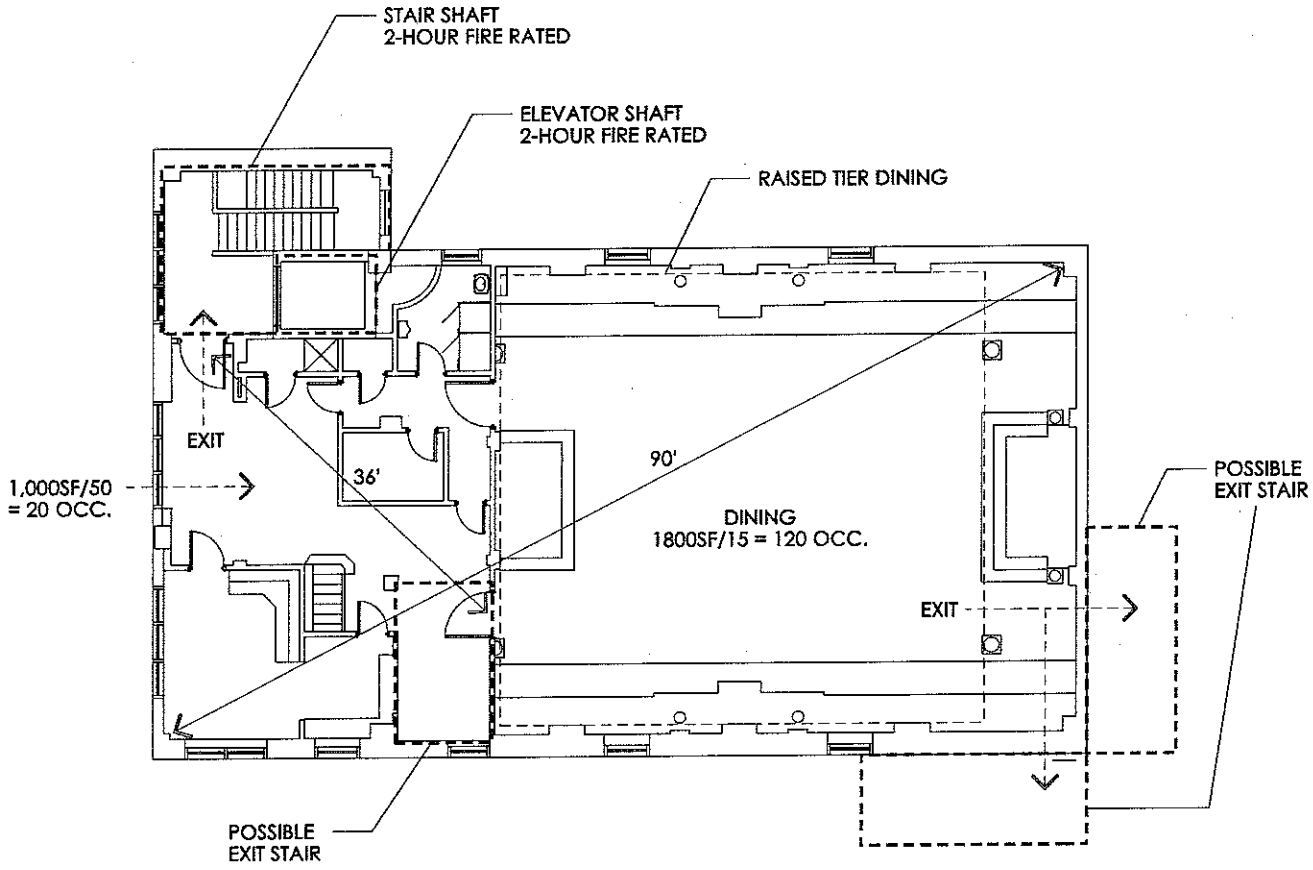
R-2 OCCUPANCY - APARTMENT



Fifth Floor Mezzanine Plan

Scale - 1" = 16'-0"

PART OF R-2 OCCUPANCY (BELOW)



Sixth Floor Plan

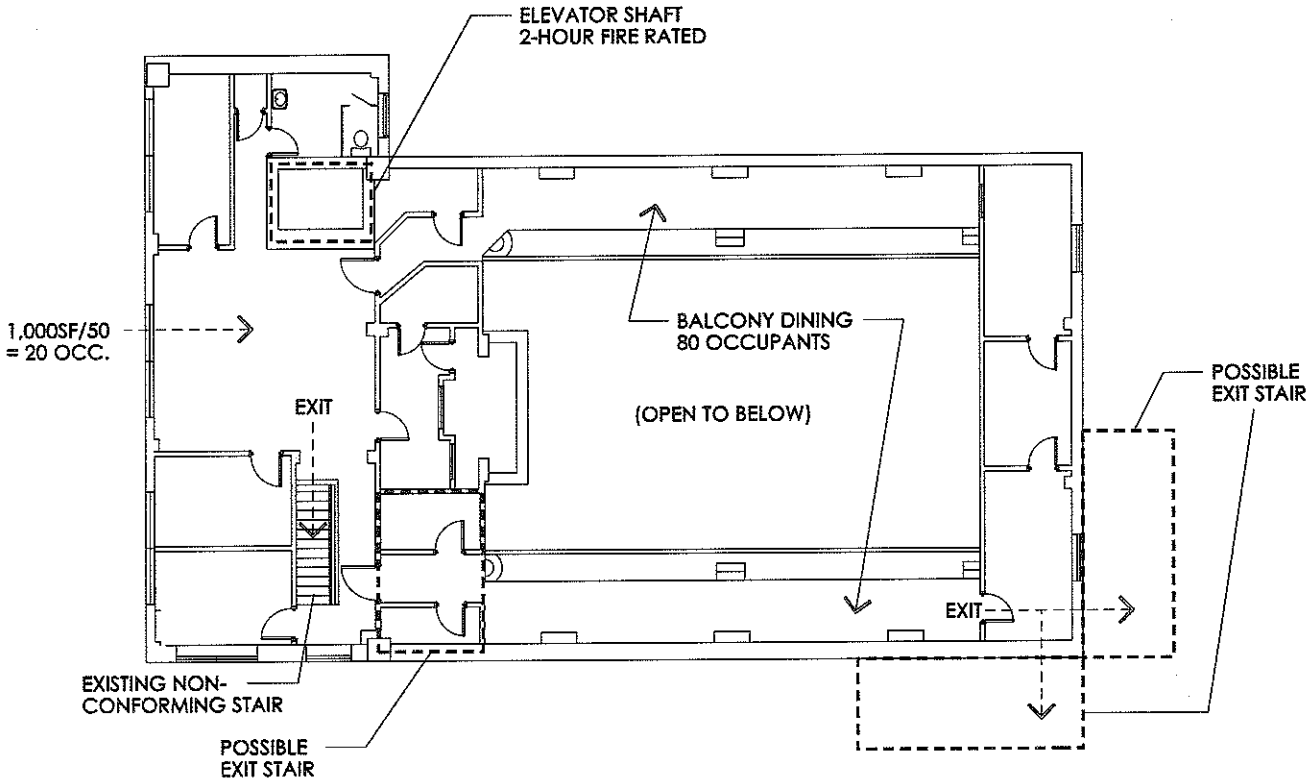
Scale - 1" = 16'-0"

A-3 OCCUPANCY - DINNER THEATER

140 OCCUPANTS (TABLES)
280 OCCUPANTS (CHAIRS ONLY)

SINCLAIR hille architects

NORTH



Seventh Floor Plan

Scale - 1" = 16'-0"

A-3 OCCUPANCY - UPPER DINNER THEATER

100 OCCUPANTS

REGISTERED PROFESSIONAL ARCHITECT
RICHARD B.
TOREN
A-1846
1-19-2010
STATE OF NEBRASKA

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