

**LIFE SAFETY CODE TRAINING SEMINAR
REQUIREMENTS OF NFPA 90A (1999 EDITION)
USING THE CORRIDOR AS A PLENUM (DATA TAG K067)
March 24, 2005**

THIS HANDOUT HAS BEEN REVISED TO REFLECT INFORMATION PROVIDED TO MDH BY CMS IN A CONFERENCE CALL ON MARCH 29, 2005.

1. Opening statements by Bob Imholte including what we must accomplish during this meeting.
2. Discussion Related to Recent Federal Monitoring Surveys (FMS).

2 of 4 facilities were cited for K067

Deficiencies were issued based on appearances – not hard facts

Facilities must prove that they are not using the corridor as a plenum

Bring copies of MDH letter to CMS and their letter of response

CMS WILL REVISE THE INFORMATION PROVIDED IN THEIR RESPONSE TO MDH.

3. What does this mean for us?

LSC survey protocols must now include an investigation of the building's HVAC system.

We CANNOT assume that buildings constructed after 1972 are not using the corridor as a supply, return, or exhaust plenum even though sections of a facility built after 1972 most likely have a fully ducted HVAC system in that section of the building.

It is not acceptable to assume that the corridor is a (Q in = Q out) system.

Although the engineering associated with the actual design of an HVAC system is complex, determining if a corridor is being used as a plenum is not all that complex. The key is determining how the air within a building is moving from the points of supply to the points of return and/or exhaust. Essentially, is the corridor being used to move the air?

Please take and retain good notes. The design of an HVAC system does not change very often. If you conduct a comprehensive investigation the first time though, it will significantly reduce effort needed in subsequent surveys.

*Given to
the
Fire Marshals
3-24-05*

4. What is a plenum?

Refer to definition in LSC and dictionary

What do these definitions mean in the real world?

→ 5. How should we investigate the building's HVAC system?

- a. Divide the facility into sections based on the year of construction. You are already collecting this information for CMS. You will also need this information when you write the deficiency at data tag K067.
- b. Ask the facility staff if they are aware of any section of the facility where the corridor is being used as a plenum. In some cases, the maintenance director already is aware of this practice.
- c. Review the ventilation system in each section of the building.

Start in the toilet rooms. Assure that the toilet rooms are equipped with exhaust fans.

Determine if the sleeping area has a supply (make-up) air diffuser.
Determine if the sleeping area has a return air diffuser.

If there are no supply and/or return air diffusers in the sleeping area, there is a good possibility that the corridor is being used as a plenum. This situation requires additional investigation.

- d. Review the corridor(s). Does the corridor have supply air diffusers? Does the corridor have return or exhaust air diffusers? Following are some of combinations of supply, return, and exhaust systems that you will observe.
 1. Each toilet room has an exhaust fan, however; there are no supply or return diffusers in the corridor(s), bedrooms, or other common spaces. The make-up air for the exhaust fans comes from opening doors and windows and from leakage in the building envelope. This situation is not a deficiency.

2. Each toilet room has an exhaust fan. There is one or more supply air diffusers in the corridor, however; there are no return or exhaust air diffusers in the corridor. There are no supply or return air diffusers in the bedrooms. The make-up air for the exhaust fans comes mostly from the supply air system in the corridor(s). This combination is a K067 deficiency.

In this case, it is doubtful that the facility could demonstrate that the corridor is balanced ($Q_{in} = Q_{out}$) or that the corridor is not being used as a supply air plenum. Most likely, this combination will require a waiver.

3. Each toilet room has an exhaust fan. There are one or more supply air diffusers in the corridor(s). There is one or more return or exhaust air diffusers in the corridor. There are no supply or return air diffusers in the bedrooms. The make-up air for the exhaust fans comes mostly from the supply air system in the corridor(s). This combination is a K067 deficiency.

This could be a $Q_{in} = Q_{out}$ design, however; the facility will have to provide evidence of compliance with the exception.

4. Each toilet room has an exhaust fan. There are one or more supply air diffusers in the corridor(s). There is one or more return or exhaust air diffusers in the corridor(s). There are supply air diffusers in the bedrooms, however; there are no return air diffusers in the bedrooms.

It is quite possible that this combination is a complying design. This combination is quite common in buildings built after 1972. The make-up air for the exhaust fans comes from the supply air within the bedroom (the bedroom is balanced) and $Q_{in} = Q_{out}$ in the corridor. In other words, both the bedrooms and the corridors are balanced.

CMS has advised that this combination is not considered deficient **provided certain criteria are met**. You must assure that the following criteria are met.

- a. Verify that the section of building in question was built after 1972. You may find this combination in a section that

predates 1972 and it may also be acceptable. 1972 is a key date because of the adoption of the ventilation chart (MN. Rule 4660.9930) as part of the licensure rules for nursing homes in that year. If the system was designed in accordance with this rule, the corridor(s) and adjoining rooms were balanced at the time of occupancy.

- b. Verify that all air-handling units are functioning.
- c. Verify that the facility has not modified the air-handling equipment or ductwork. If the air-handling units have been modified (fan speed, voltage, etc), or replaced, the system may no longer be in balanced as originally designed.
- d. Ascertain who conducts maintenance on the HVAC system. CMS expects that a licensed HVAC contractor, not the facility's maintenance staff, accomplish the required repair work.

Based on all of these criteria, you must make a professional judgment regarding whether or not the HVAC system still complies with NFPA 90A. CMS has advised that if it appears that the system is no longer installed according to the original design or that it is not functioning and being maintained properly, you must cite K067. If all appears to be in order, there is no deficiency.

CMS has advised that this combination requires evidence that the corridor(s) are not being used as a plenum. Acceptable evidence is discussed later in this handout.

- 5. Each toilet room has an exhaust fan. There are one or more supply air diffusers in the corridor(s). There are one or more return air diffusers in the corridor(s). There are supply and return air diffusers in the bedrooms. This combination is not considered a deficiency provided the criteria listed and discussed in #4 above are met. You must perform the steps detailed in #4 and make the same professional judgment for this combination.

- e. Many nursing homes have installed fan coil units. Fan coil units are generally installed in the outside wall of the bedroom underneath the window. There are two types of fan coil units. Reference to a "fan-coil unit" in this handout means a mechanical ventilation unit that cools and/or heats recycled air from the room. In other words, a fan coil unit only conditions air that is already within the room.

An induction fan coil unit also has the capability of drawing in air from the outside. There are also fan coil units that are mounted above a suspended ceiling that only cool the air in the room.

Until further notice, fan coil units, induction fan coil units, and window air conditioners can be ignored in evaluating the building's HVAC system. This position is justified because the amount of air that is moved by these units is minimal as compared to the other air-handling units. In addition, the requirement for automatic shutdown of fans upon activation of the fire alarm system applies to air-handling units moving more than 2000 CFM of air. Fan coil units, induction fan coil units, and window air conditioners generally do not move anywhere near this volume of air.

A discussion during this training session has indicated that eliminating these units from the evaluation process is an acceptable risk as related to the migration of smoke within a building. It was agreed that smoke is going to migrate within a building as a consequence of any fire and that these units do not exacerbate this migration.

- f. There are a number of roof-mounted air-handling units that function like the through-wall induction fan coil units. These units generally have concentric cones that drop into the building through the roof. The air is supplied through the larger outside cone; air is returned through the smaller inside cone. Some of these units have an air-handling capacity that exceeds 2000 CFM. In reviewing the HVAC system in each section of the building, be sure to include questions regarding this type of air-handling unit. These units must be considered a supply air source.
- g. Nursing homes may have a suite of rooms, such as a physical therapy suite. Review a suite just as you review an individual room.
- h. Be aware of common spaces that are open to the corridor. In some cases, an AHU may be supplying a large amount of air into a dining or dayroom space where there is no corridor ventilation. Exhaust fans in other parts of the section, such as the toilet rooms, are pulling the air into the corridor and adjacent bedrooms. This is most likely a deficiency.

In some cases, you may find a common space open to the corridor where an AHU in supplying air within the common space. The return air diffuser(s) is/are located in the corridor some distance from the common space. For purposes of the HVAC system, the common space is

considered part of the corridor system and this may be a balanced corridor system.

- i. The ventilation system designed for both infectious and protective isolation rooms assumes that the corridor door(s) are closed at all times except when a person is entering or exiting. If the corridor to the isolation room is not kept closed, the corridor is being used as a plenum.
- j. CMS has advised that certified construction plans and/or a balancing report may be used as evidence of compliance provided that; 1) the HVAC system has not been modified from the original design; 2) that the HVAC system is functioning properly; and 3) the HVAC system has been properly maintained. The facility has the responsibility of providing and explaining this evidence if they use it to demonstrate compliance. If you are uncomfortable reviewing the evidence, advise that the facility contact the Engineering Services Section.

The date of the balancing report is not important provided the three criteria stated in the above paragraph are met. This allows the facility to use the original balancing report, a subsequent balancing report, or a new balancing report obtained in anticipation of an upcoming re-certification survey.

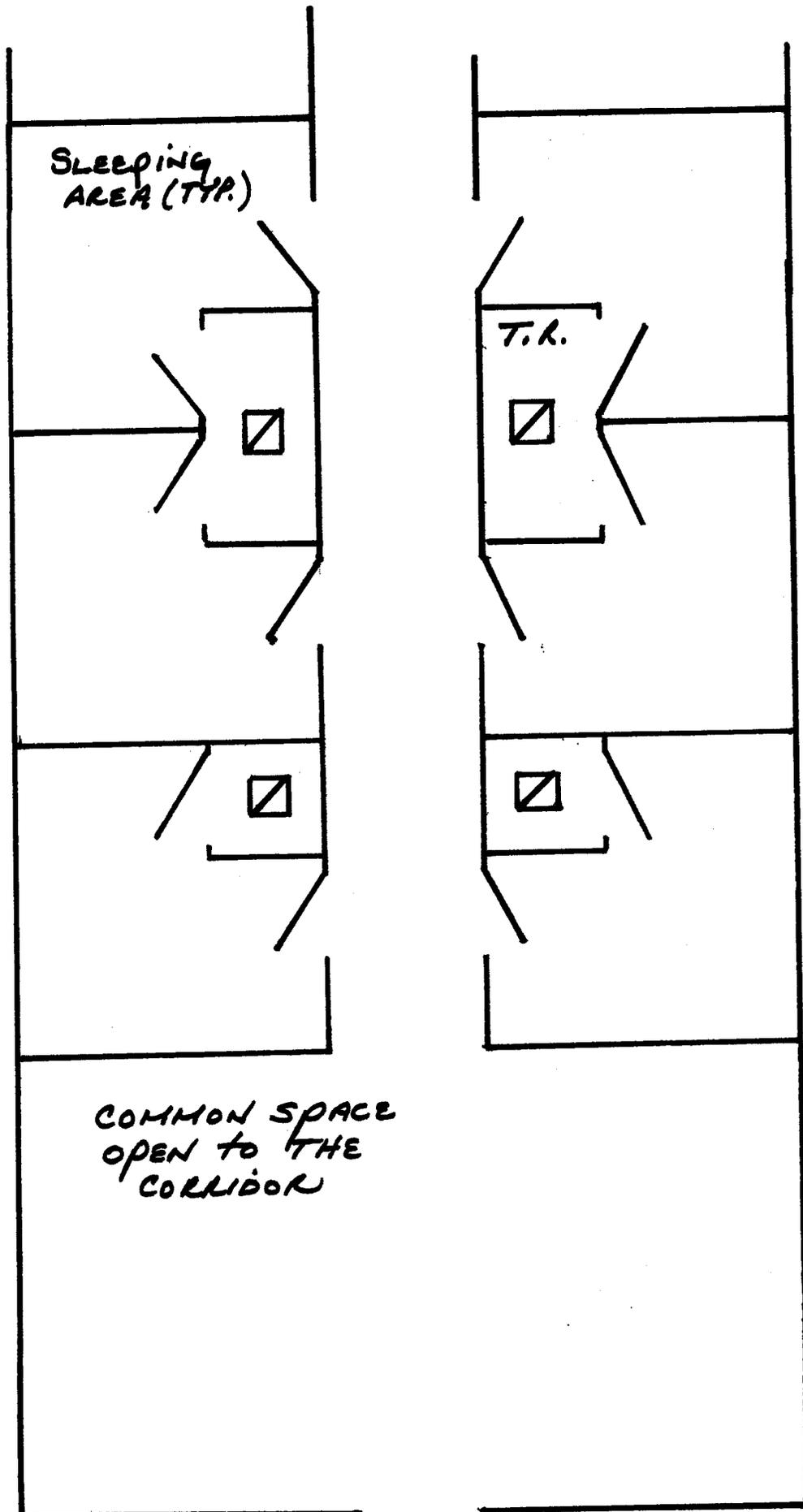
MDH is also going to recommend that providers become intimately familiar with their building's HVAC system. We want them to be able to describe the system, section by section, and to be able to identify all air-handling equipment, ductwork, grills, and diffusers associated with each system.

It is anticipated that a significant number of facilities will require a waiver for data tag K067. The facility will be required to complete the K084 page. We have decided that MDH and the SFM will cooperatively develop sample K084 pages for fully sprinkled buildings and buildings with no sprinkler system. These samples can be provided to the facility as an aid in preparing their own K084 page.

Drawings that illustrate the combinations detailed in 5d1 through 5d5 will be forwarded to you in the very near future.

☒
SUPPLY

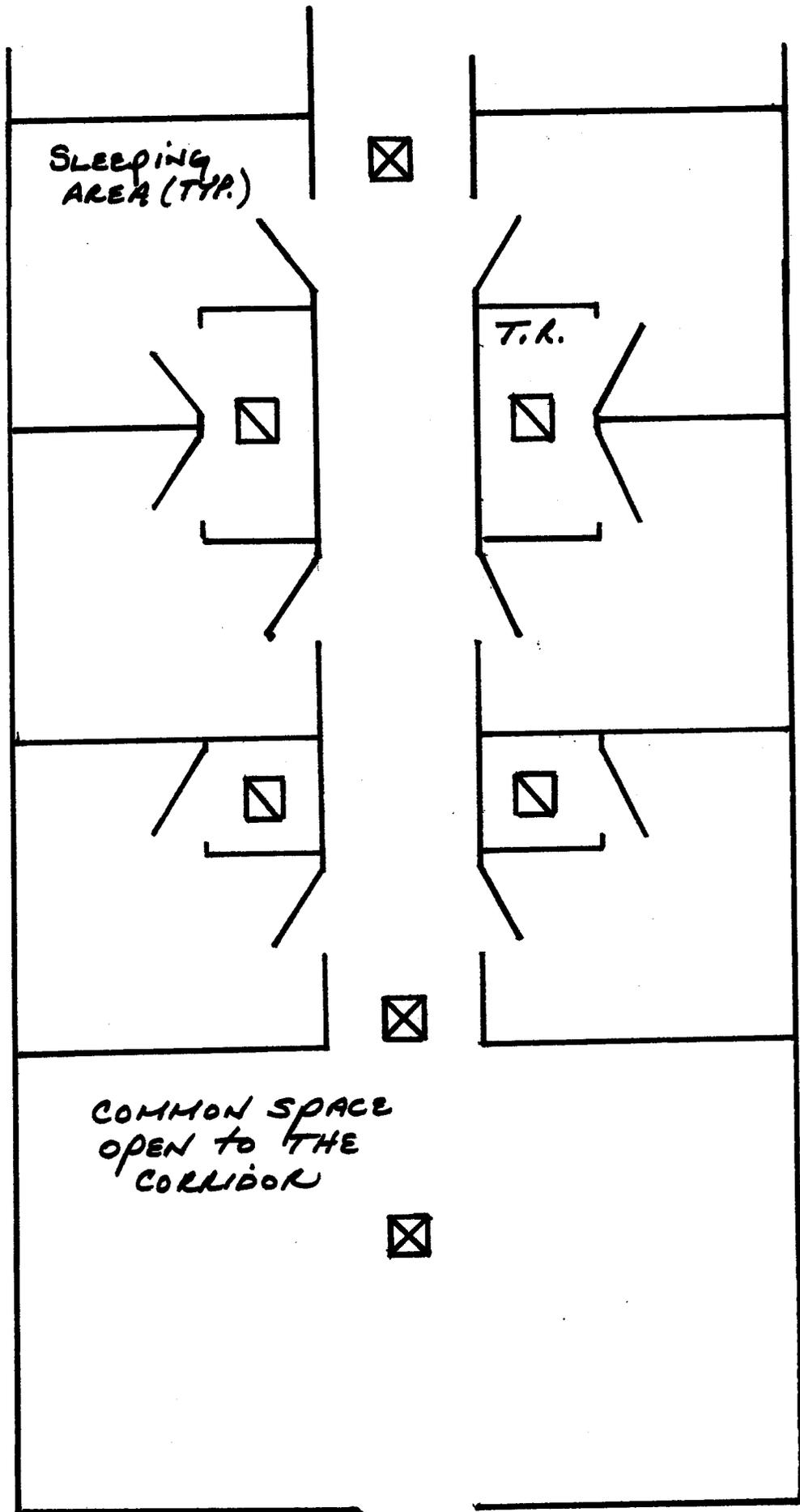
☐
RETURN
OR
EXHAUST



COMBINATION 5d1

☒
SUPPLY

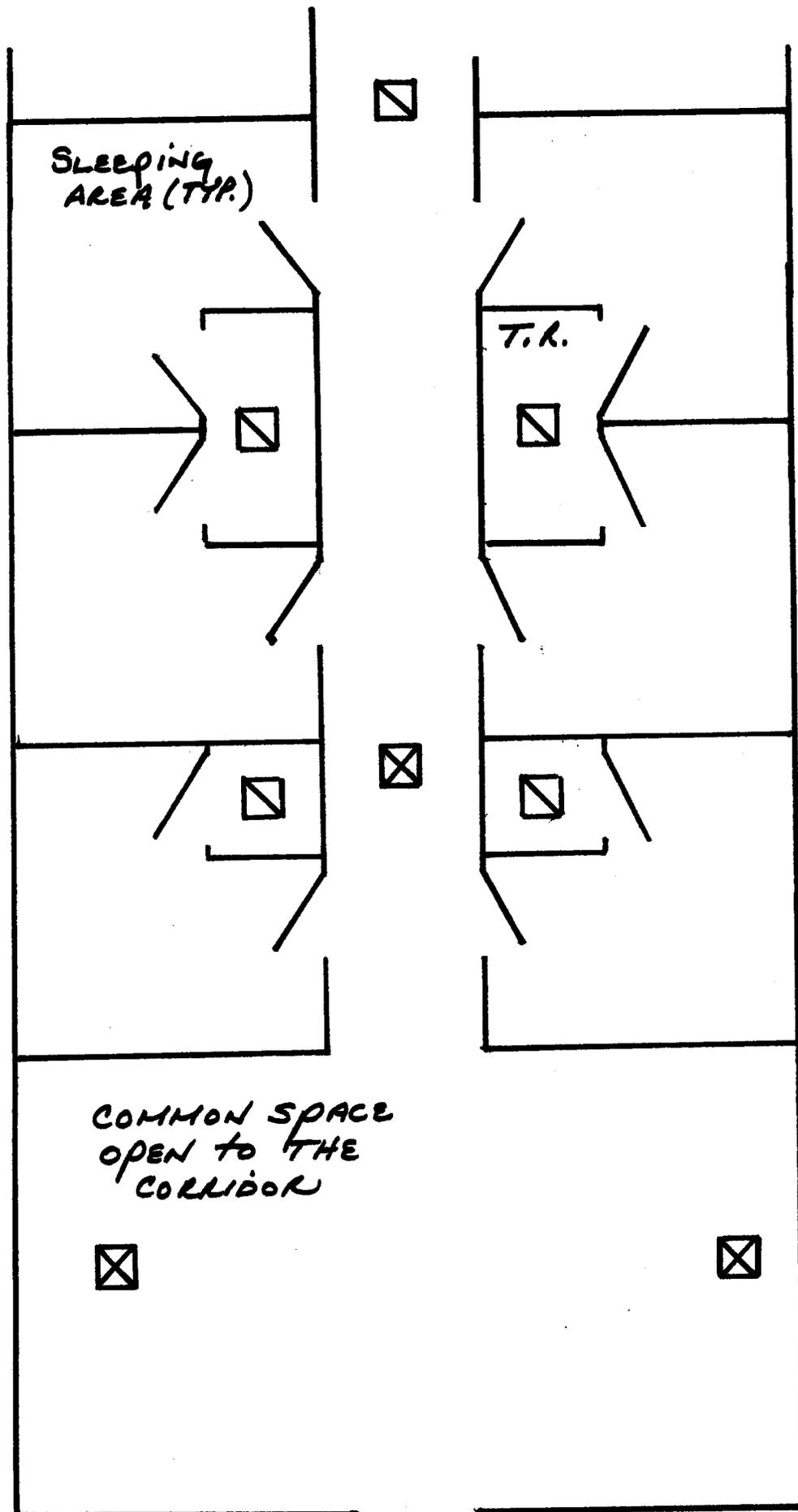
☐
RETURN
OR
EXHAUST



COMBINATION 5d2

☒
SUPPLY

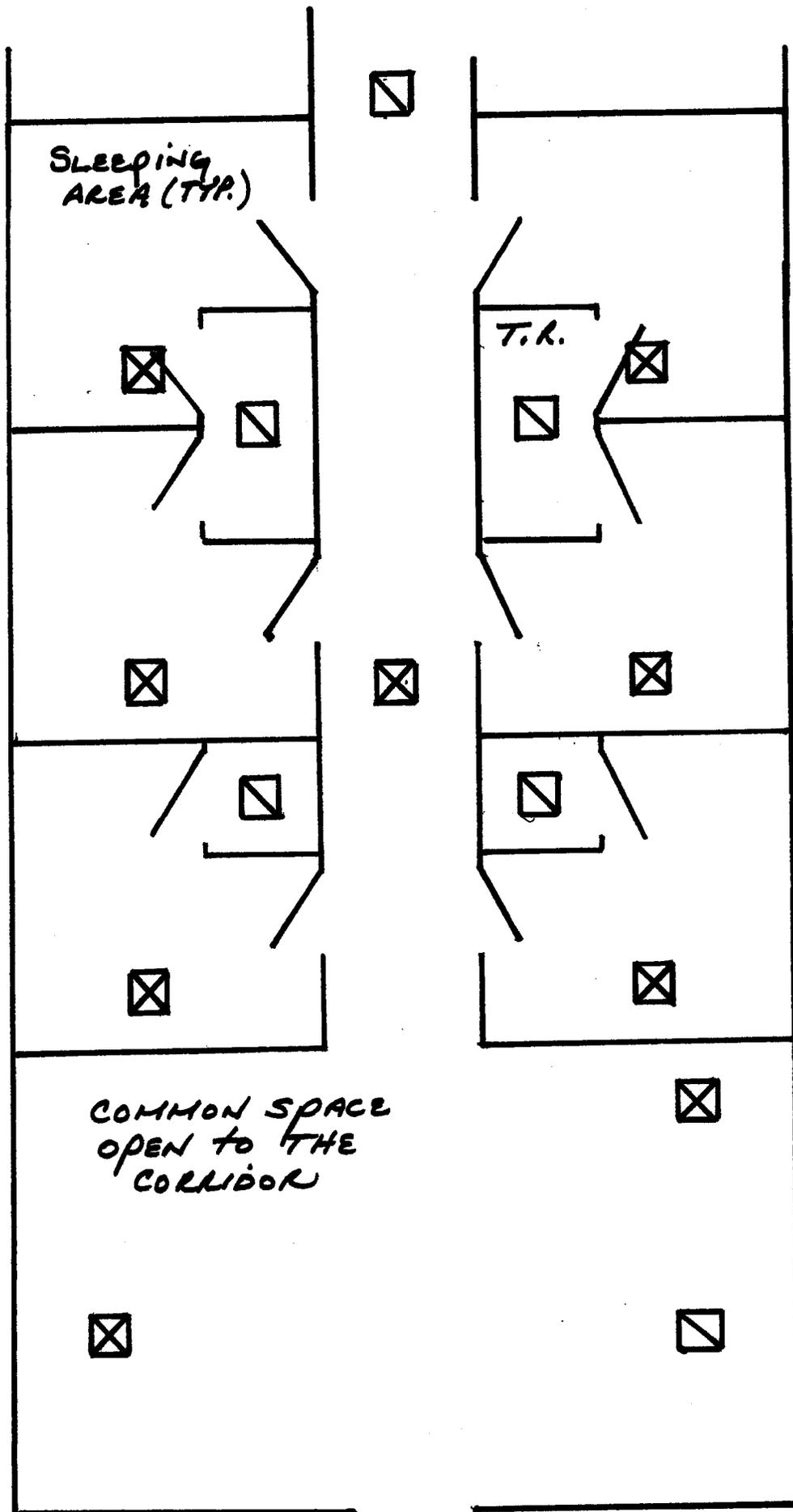
☐
RETURN
OR
EXHAUST



COMBINATION 5d3

☒
SUPPLY

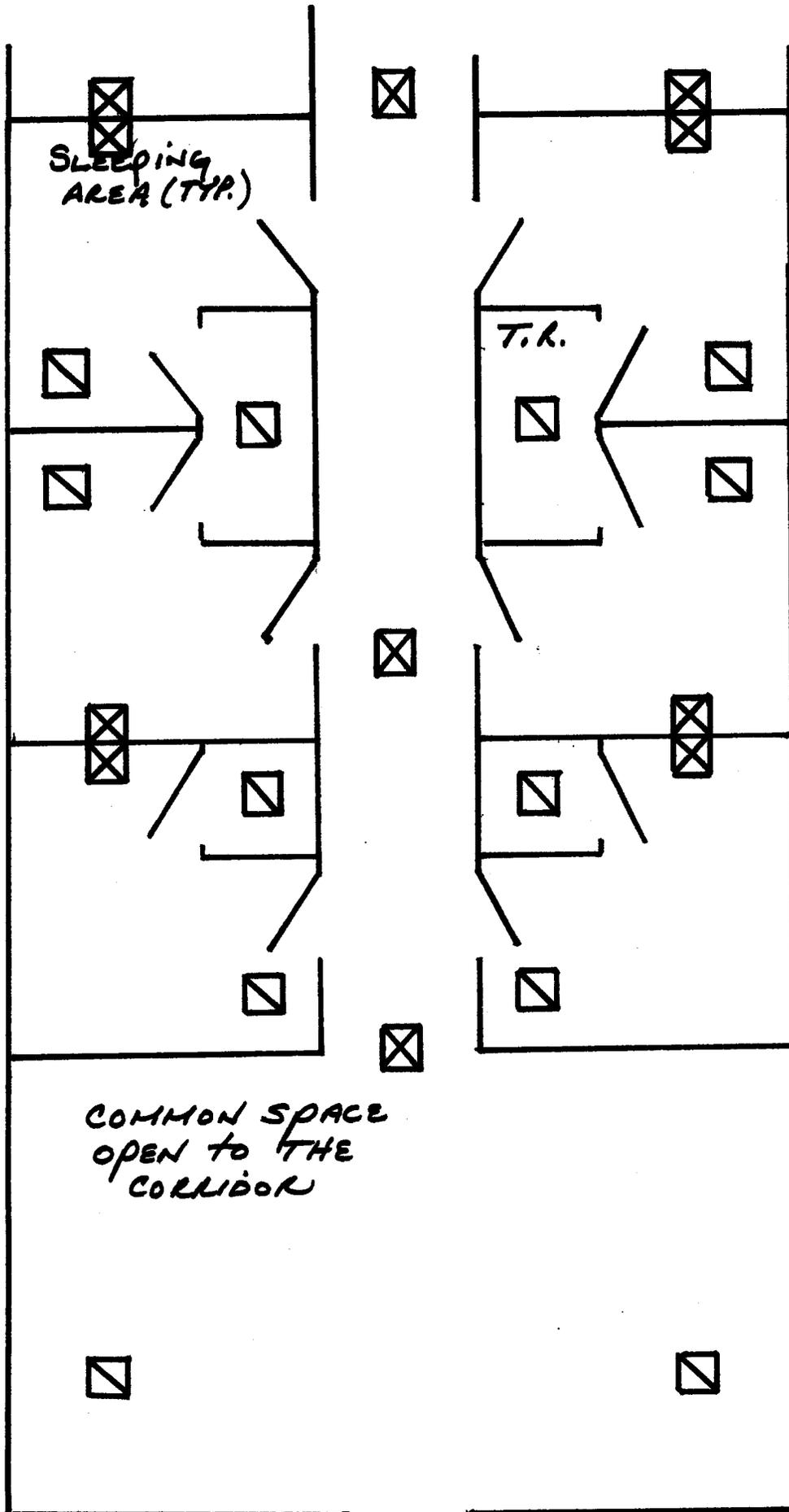
☑
RETURN
OR
EXHAUST



COMBINATION 5d4

☒
SUPPLY

☐
RETURN
OR
EXHAUST



COMBINATION 5d5